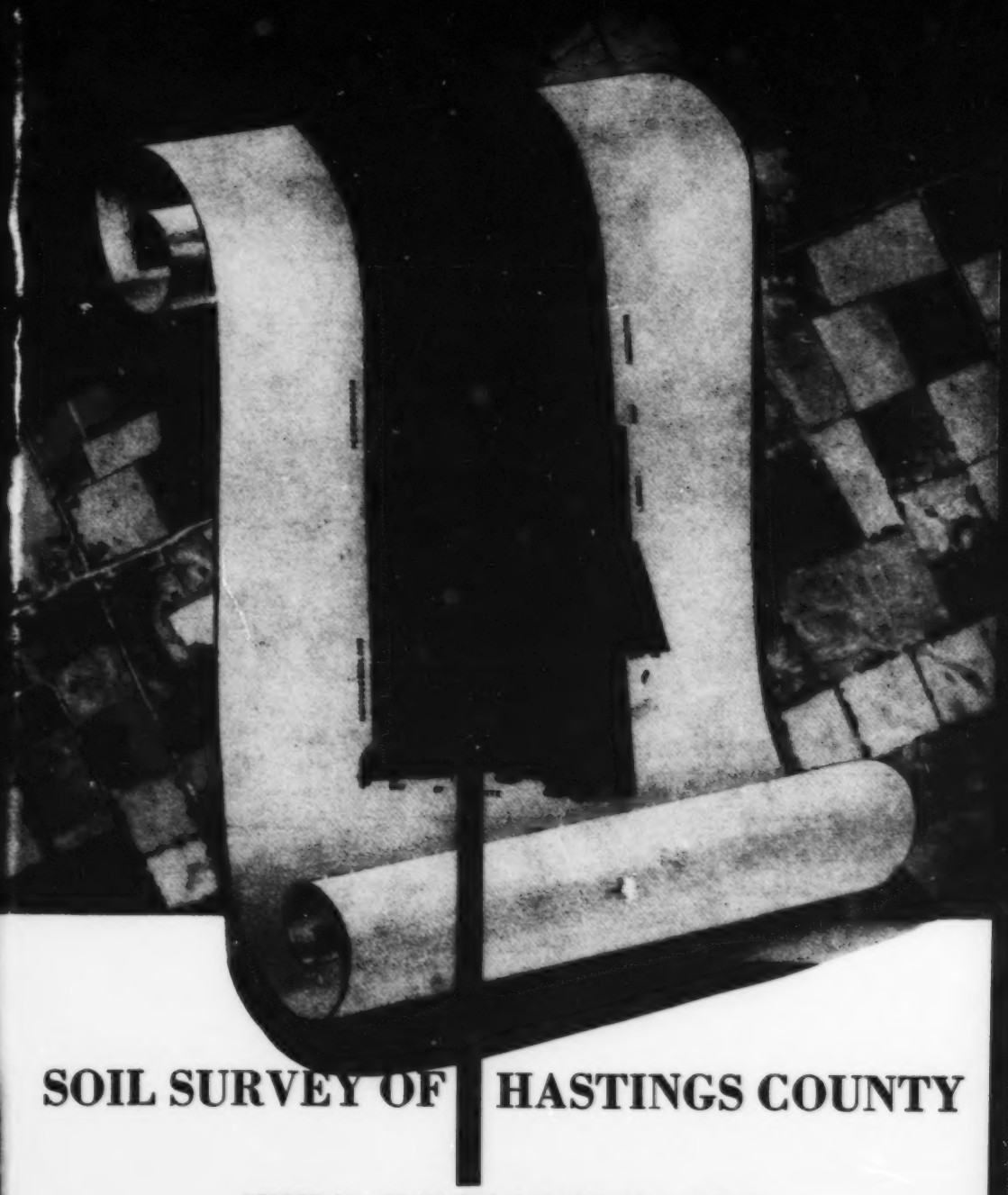

SOIL SURVEY OF HASTINGS COUNTY

REPORT No. 27 OF THE ONTARIO SOIL SURVEY

Prepared jointly by The Research Branch, Agriculture Canada and the Ontario Agricultural College

Ontario Ministry of Agriculture and Food

Agriculture Canada
Research Branch
Direction générale de la recherche

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SOIL SURVEY

of

HASTINGS COUNTY

by

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GUELPH, ONTARIO
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1962

SOIL SURVEY MAPS AND REPORTS
PUBLISHED BY COUNTIES

Norfolk	Map No. 1
Elgin	Map No. 2
Kent	Map No. 3
Haldimand	Map No. 4
Welland	Map No. 5
Middlesex	Map No. 6
Carleton	Report No. 7
Parts of Northwestern Ontario	Report No. 8
Durham	Report No. 9
Prince Edward	Report No. 10
Essex	Report No. 11
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Victoria	Report No. 25
Manitoulin	Report No. 26
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INTRODUCTION

The soil survey of Hastings County was begun in 1952 for the purpose of making an inventory of its soil resources. This consisted of the mapping of the various soils and gathering information about their characteristics from which to estimate their adaptability for the growing of agricultural crops.

The following report contains a summary of the characteristics of each soil and offers suggestions concerning the management practices that may be required in order to obtain the best results. Those who are seeking soils information about a certain area should locate the area on the map, note the colour or colours and the indicated map symbol and use the key to determine the soil type or types involved. Description of these types may then be found in the report.

GENERAL DESCRIPTION OF THE AREA

Location and Area

Hastings County is located in what is called South central Ontario; its southern border is on the Bay of Quinte, its western border is bounded by Northumberland, Peterborough and Haliburton Counties. On the east it is bordered by Lennox and Addington, and Renfrew County lies to its north and northeast.

The County has a total land area of 1,486,720 acres* of which 561,131 acres are occupied farm land.

County Seat and Principal Towns

The city of Belleville is the County seat with a population of 19,519*. It is located on the north shore of the Bay of Quinte at the mouth of the Moira River. The excellent business section in this city serves a large rural community.

Trenton, in the southwest corner of the County, has a population of 10,085. It is eleven miles west of Belleville and provides a market for local farm produce. The town of Deseronto is located in the southwestern corner of Hastings and has a population of 1,522. Other places of importance in the County are Madoc 1,240, Marmora 1,117, Bancroft 1,334, Frankford 1,393, Stirling 1,100 and Tweed 1,562. The County Agricultural Office is located at Stirling.

Population

The total population of Hastings County as recorded by the 1951 census is 74,298 persons, 17,403 of these being rural dwellers. This population figure is the highest in the history of the County, but there has been a decline in the farm population as is shown in Table 1.

TABLE 1

TREND IN POPULATION

Year	Total Population	Farm Population
1871	48,364	.....
1881	55,061	.....
1891	59,084	.....
1901	59,291	.....
1911	55,803	.....
1921	57,523	.....
1931	58,846	22,391
1941	63,322	19,117
1951	74,298	17,403

* Ninth Census of Canada, 1951.

Transportation and Markets

The southern part of the County is well supplied with good roads. Two highways, Nos. 2 and 7, cross the County east and west, the former through Trenton, Belleville and Deseronto; the latter through Marmora, Madoc and Actinolite. Running north and south between these two highways are Nos. 14 and 37, providing service between Belleville and Marmora and Belleville and Actinolite

FIGURE 1. Outline map of Ontario showing location of Hastings County.

respectively. Another hard top road branches off No. 14 at Foxboro and terminates at Madoc. Highway No. 401 extends across the County just north of highway No. 2. This network of hard surfaced highways provides excellent year round transportation for this agriculturally important part of the County. The northern portion that lies north of highway No. 7 has a low density of population and a few good roads. Highway No. 62 is the main artery through this section running from No. 7 at Madoc through Bancroft to Maynooth and east into Renfrew County.

The Canadian National and Canadian Pacific Railway main lines traverse the southern part of the County. Branch lines run from Belleville to Madoc and from Maynooth in the north to Eldorado and Marmora.

Present Agriculture

Table 2 presents data for acreage, main crops grown and livestock population by areas in Hastings County. The first area shown as area No. 1 is very large and includes fifteen northern townships lying within the Precambrian Shield. Much of this area is forested and has a low density of population. Some farms have developed on the areas most suitable for farming and are therefore quite scattered and in many cases isolated. There are a few areas where several farms form small rural communities. Area No. 1 accounts for 56 per cent of the total land area of the County but has a low agricultural output.

The second area reported in Table 2, lies between the rough land of area 1 and the good agricultural soils of the south. This area is a mixture of good agricultural land and non-agricultural land. The good soils of the area are mostly developed from local calcareous shale and are loamy till soils. This is an important cheese producing area.

TABLE 2

PRESENT LAND USE AND LIVESTOCK POPULATION BY AREAS

	Total Area Acres	% of Total	Hay Acres	Oats Acres	Mixed Grain Acres	Improved Pasture	Cows and Heifers			Sheep	Swine
							Milk	Beef	Other		
Area No. 1 McClure, Wicklow, Bangor, Herschel, Monteagle, Carlow, Faraday, Dungannon, Mayo, Wollaston, Limerick, Cashel, Tudor, Grimsthorpe, Elzevir	837,146	56.0	18,825	7,904	687	16,141	4,258	289	2,219	2,263	3,464
Area No. 2 Marmora, Madoc Lake	203,379	13.8	11,402	7,613	1,436	7,210	4,999	651	2,141	964	6,535
Area No. 3 Rawdon, Huntingdon, Hungerford	221,372	15.0	28,287	19,660	1,772	18,341	12,677	1,353	6,505	2,431	17,029
Area No. 4 Sidney, Thurlow, Tyendinaga	224,823	15.2	34,662	24,866	4,079	19,798	14,340	1,003	5,517	2,034	16,927
TOTALS	1,486,720	100%	93,176	60,043	7,974	61,490	36,274	3,396	16,382	7,692	43,955

Ninth Census of Canada — 1951

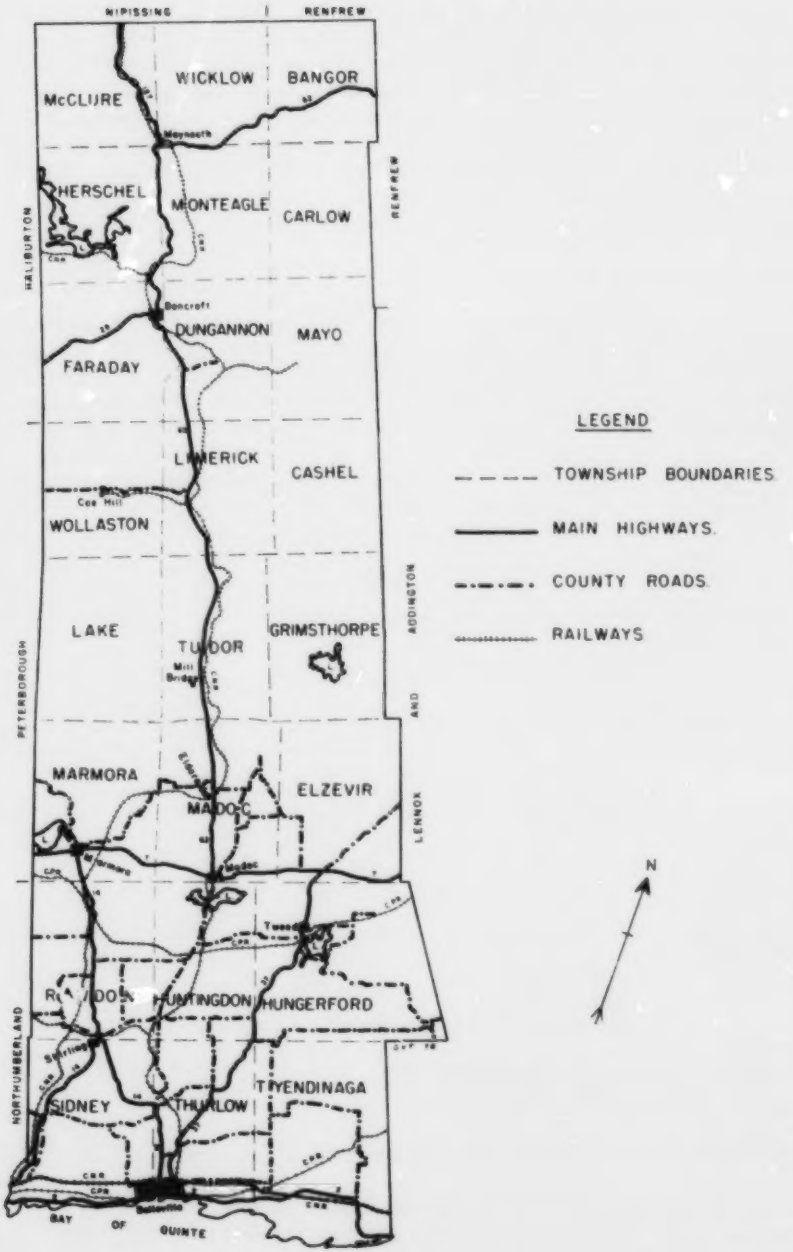


FIGURE 2. Townships, Principal Towns, Highways and Railroads in Hastings County.

The third area is composed mainly of calcareous till soils of loam and sandy loam texture. The area includes some of the best agricultural soils of the County. There is a somewhat more diversified agriculture in this area with a trend to more cash crops such as fall wheat, peas, sweet corn and grain corn. Table 2 shows that about half of the livestock population consists of beef cattle.

Area No. 4 contains the southern three townships and the soils are dominantly lacustrine including large areas of poorly drained clay. This restricts the range of crops which may be grown and dairying is the dominant farm enterprise. Hay, oats and ensilage corn are the main crops grown on these fine textured soils.

In 1949 Hastings County produced 7,052,567 lbs. of cheddar cheese which made the County the highest cheese producing County in Ontario. By 1958 cheese production had dropped to 4,255,816 lbs. and the County had fallen to sixth place. The drop in cheese production was accompanied by an increase in other dairy products so that the farm economy still rests largely on the dairy industry.

GEOLOGY

Bedrock Geology

A major separation in the bedrock geology of Hastings County occurs between the Precambrian rocks and the rocks of the Ordovician period. Figure 2 shows the distribution of the main geological formations. The line of contact between the Precambrian and Ordovician rocks passes through the townships of Hungerford, Huntingdon, Rawdon and Marmora. The Ordovician limestones are separated into two series, Black River and Trenton. The former is a dense thickly bedded limestone, whereas the latter is generally thinly bedded and much more susceptible to weathering. Both limestones have a low percentage of magnesium carbonate, frequently less than 1 per cent.

The Precambrian rocks occupy more than 50 per cent of the County and are composed of granite, granite gneiss, chorite, gabbro, paragneisses, conglomerate, basic volcanics, crystalline limestone and numerous minerals and ores.

Shale beds within the Black River formation are found north of Madoc in the Eldorado, Queensboro area. This is a red and grey layered shale and it has a fairly high content of magnesium carbonate. It is the source from which a considerable amount of the soil material in that area has been derived.

Surface Deposits

The surface deposits that occur in a given region owe their origin to the action of any one or combinations of three forces, namely, ice, water or wind. In this region of Ontario the surface deposits have originated almost entirely as the result of the work of glacial ice and of still and moving water. The unsorted deposits laid down by moving ice, and which are called till, cover by far the greatest area of the County. This material varies considerably from the northern end of the County to the southern end depending upon the nature of the underlying bedrock. The hard quartzites, gneisses and slates of the Precambrian region resisted the abrasive action of the moving ice with the result that very little soil material was formed and that which does occur is very stony. This northern region has therefore, a thin coating of till over bedrock and the nature of the relief in most areas is a reflection of the relief of the bedrock.

In the limestone region to the south, till is the predominant surface deposit except in a border along Lake Ontario. These till deposits are deeper than those

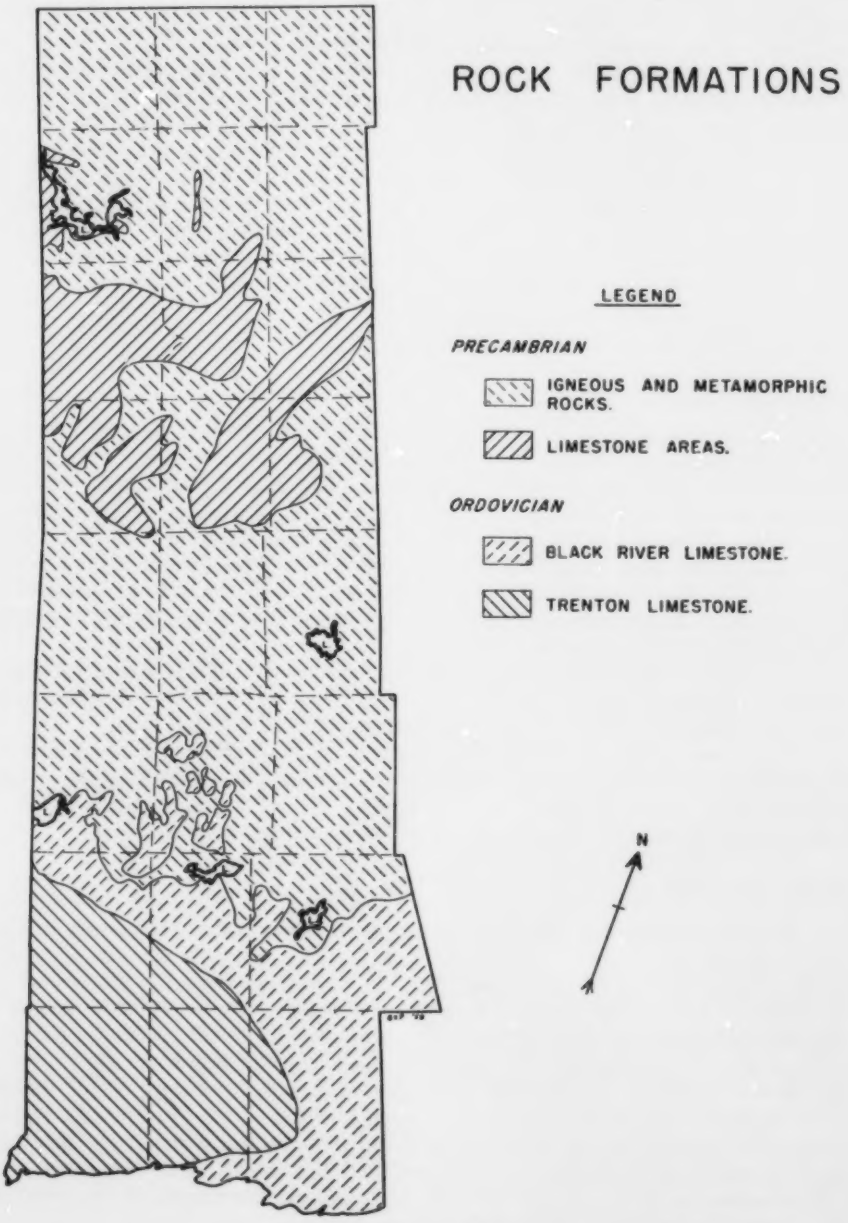


FIGURE 3. Outline Map showing the bedrock geology of Hastings County.

in the Precambrian region, and are derived from the hard thickly bedded Black River limestone. The material that forms the hilly areas around Stirling and the southwestern part of the County is derived from the soft Trenton limestone and consequently the soil is less stony and the deposits are thicker.

Along the southern boundary of the County are lacustrine deposits that date from old glacial lakes. These are clay deposits occurring on a relatively flat plain and extending northward from the present lakeshore for several miles. Some complexity occurs therefore, where they join the rolling till deposits, with the result that isolated hills composed of till may be completely surrounded by lacustrine clay.

Coarse textured deposits such as sand and gravel are small in area and are scattered widely over the County. The larger deposits occur in the Precambrian region near Bancroft and Madoc. Most of this material was laid down by glacial streams and therefore occurs on many upland areas as small outwash plains and occasionally in the form of eskers. In the southern part of the County some limestone has been incorporated with the sand producing a calcareous sand deposit in contrast to the acid sands of more northerly regions.

DRAINAGE

The external drainage system in Hastings County is shown in Fig. 3. The height of land in the Wollaston, Limerick and Cashel township area divides the County so that the streams north of this divide flow to the northeast while south of this headland the stream flow is south and southwest. Most of the streams in the County are fed by the numerous lakes and swamps in the Precambrian shield. The volume of water carried by rivers such as the Moira fluctuates greatly and spring floods are common.

CLIMATE

The climate of a region governs the kind of crops which can be grown and the yield which can be obtained.

The southern part of Hastings County has a lower effective moisture supply than many areas of Southern Ontario and in this region moisture becomes a limiting factor in crop growth.

Tables 6 and 7 give the monthly mean temperatures and precipitation data for a number of stations located in the County. Belleville is on the Bay of Quinte in the extreme south. Stirling is twelve miles northwest and Tweed is about thirteen miles northeast of Belleville. Queensboro is twenty-eight miles north and Bancroft about sixty-four miles north of Belleville.

TABLE 3

MEAN MONTHLY AND ANNUAL TEMPERATURES IN HASTINGS COUNTY

Station	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Belleville 44 years	19	19	28	42	54	65	70	68	60	47	35	22	44
Stirling 15 years	17	18	29	42	54	64	69	67	59	48	36	22	44
Tweed 29 years	15	17	29	42	55	65	69	67	59	47	35	21	44
Queensboro	14	14	24	40	54	64	69	66	58	47	34	21	42
Bancroft	10	10	22	39	53	61	66	62	55	44	30	18	31

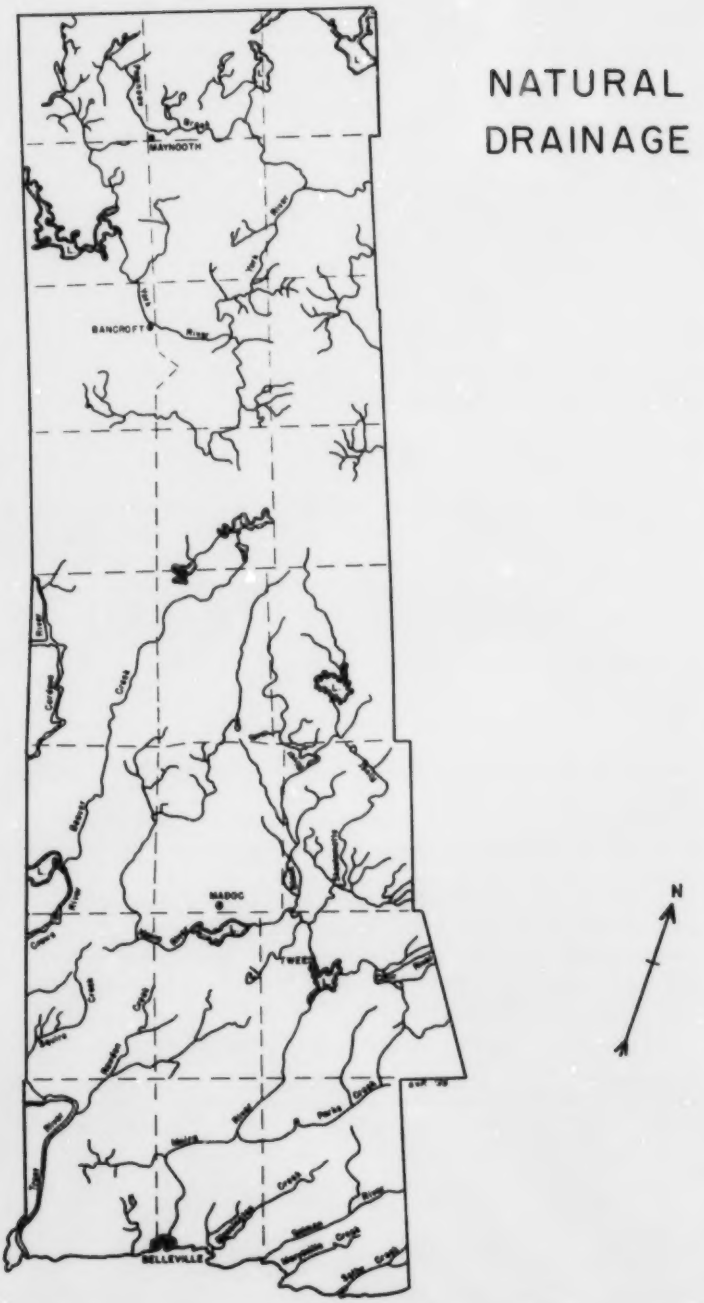


FIGURE 4. Outline Map showing the natural drainage courses in Hastings County.

TABLE 4

MEAN MONTHLY AND ANNUAL PRECIPITATION IN HASTINGS COUNTY

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Belleville 44 years	3.26	2.46	2.63	2.17	2.37	2.66	2.52	2.65	2.78	2.28	2.85	2.54	31.17
Stirling 10 years	2.88	1.96	2.66	2.23	3.45	2.00	3.59	2.18	2.49	2.70	2.73	2.62	31.48
Tweed 29 years	3.12	2.20	3.25	2.30	3.23	2.71	3.26	2.19	3.31	2.73	3.32	2.92	34.54
Queensboro	3.00	2.50	2.40	2.20	2.10	2.50	2.40	3.30	2.00	2.40	2.50	2.60	30.00
Bancroft	3.70	2.90	2.40	1.60	2.80	3.10	2.80	2.10	2.70	2.40	3.30	2.60	32.40

Applying Thornthwaite's method for determining potential evapotranspiration (water need) the amount of moisture available for plant growth can be estimated. Using the climatic data in Tables 6 and 7 and in addition, the number of hours of daylight, the heat index for the station, and soil moisture storage, one can determine the moisture balance for each month of the growing season.

Laboratory work has shown that loam soils hold approximately 4 inches of water that is available to plants and this value has been used in computing the soil moisture deficiencies.

TABLE 5

MOISTURE DEFICIENCIES AS DETERMINED BY THORNTHWAITE'S METHOD*

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Belleville 44 years													
Water Need	.0	.0	.0	1.1	3.1	4.5	5.3	4.5	3.0	1.5	0.3	.0	23.5
Precipitation	3.3	2.5	2.6	2.2	2.4	2.7	2.5	2.6	2.8	2.3	2.8	2.5	31.2
Storage in Soil of Available Moisture (Loam Type)	4.0	4.0	4.0	4.0	3.3	1.5	.0	.0	.0	0.8	3.3	4.0	—
Deficiency							1.3	1.9	0.2				3.4
Stirling 10 years													
Water Need	.0	.0	.0	1.0	2.9	4.5	5.2	4.5	3.0	1.6	0.3	.0	23.0
Precipitation	2.9	2.0	2.7	2.2	3.5	2.0	3.6	2.2	2.5	2.7	2.7	2.7	31.5
Storage in Soil of Available Moisture (Loam Type)	4.0	4.0	4.0	4.0	4.0	2.5	0.9	—	—	1.1	3.5	4.0	—
Deficiency								1.4	0.5				1.9
Tweed 29 years													
Water Need	.0	.0	.0	1.1	3.1	4.6	5.1	4.6	3.0	1.4	.2	.0	23.1
Precipitation	3.1	2.2	3.3	2.3	3.2	2.7	3.3	2.2	3.3	2.7	3.3	2.9	35.4
Storage in Soil of Available Moisture (Loam Type)	4.0	4.0	4.0	4.0	4.0	3.0	1.7	—	.8	2.1	4.0	4.0	—
Deficiency								2.1					2.1

* Courtesy of L. J. Chapman, Ontario Research Foundation.

TABLE 5 (Cont.)

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Queensboro													
Water Need	.0	.0	.0	0.9	3.0	4.6	5.4	4.6	3.0	1.5	0.2	.0	23.2
Precipitation	3.0	2.5	2.4	2.2	2.1	2.5	2.4	3.3	2.0	2.4	2.5	2.6	29.9
Storage in Soil of Available Moisture (Loam Type)	4.0	4.0	4.0	4.0	3.1	1.0	—	—	—	0.9	3.2	4.0	—
Deficiency							2.0	1.3	1.0				4.3
Bancroft													
Water Need	.0	.0	.0	0.9	3.1	4.3	5.2	4.2	2.8	1.3	.0	.0	21.8
Precipitation	3.7	2.9	2.4	1.6	2.8	3.1	2.8	2.1	2.7	2.4	3.3	2.6	32.4
Storage in Soil of Available Moisture (Loam Type)	4.0	4.0	4.0	4.0	3.7	2.5	0.1	—	—	1.1	4.0	4.0	—
Deficiency								2.0	.1				2.1

The above data is not a complete record and therefore may only indicate temporary trends.

The records for Stirling are for only 10 years. The stations at Queensboro and Bancroft are presently inactive and the records used here are old records. The table shows serious moisture deficiencies for July and August at Belleville and Queensboro. Stirling, Tweed and Bancroft areas show soil moisture deficiencies in August, carrying into September. These deficiencies are for loam soils; clay soils will have less and sandy soils greater deficiencies.

TABLE 6

CLIMATIC SUMMARIES FOR HASTINGS COUNTY

Station	Av. Frost-Free Period Days	Last Frost (Spring)			First Frost (Fall)			No. of Years	Lat. N	Long. W
		Average	Earliest	Latest	Average	Earliest	Latest			
Belleville	147	May 10	Apr. 17	June 1	Oct. 4	Sept. 19	Oct. 24	33	44° 12′	77° 23′
Stirling	131	May 14	May 4	June 1	Sept. 22	Sept 4	Oct. 3	11	44° 19′	77° 38′
Madoc	128	May 17	May 5	June 4	Sept. 22	Aug. 30	Oct. 3	9	44° 30′	77° 29′
Tweed	138	May 12	Apr. 23	May 24	Sept. 27	Sept. 11	Oct. 13	22	44° 30′	77° 19′
Queensboro	125	May 17	Apr. 23	May 30	Sept. 19	Sept. 4	Oct. 1	31	44° 36′	77° 25′
Bancroft	98	June 2	May 4	June 29	Sept. 8	July 25	Oct. 8	51	44° 05′	77° 52′

It will be noted in Table 6 that there is a wide range in frost-free periods in Hastings County. There is a difference of 22 days between Belleville and Queensboro and 49 days difference between Belleville and Bancroft.

THE CLASSIFICATION AND DESCRIPTION OF THE SOILS

The surface deposits previously described are the parent materials from which the soils have developed. This development has taken several forms, as a result of differences in the parent materials as well as in the effects produced by differences in drainage and in vegetation.

Under the cool humid conditions present in this region, and with forest vegetation, the processes of soil development tend toward acid conditions. This acid condition is the result of the removal of bases, particularly calcium, from the surface layers of the soil by percolating water. This is referred to as a process of leaching, and the effect produced on the soil is in the development of layers or horizons that differ from one another in thickness, colour and structure and frequently in texture. Where the soil material is derived largely from limestone, the process is slowed up and acid soils have not had time to develop.

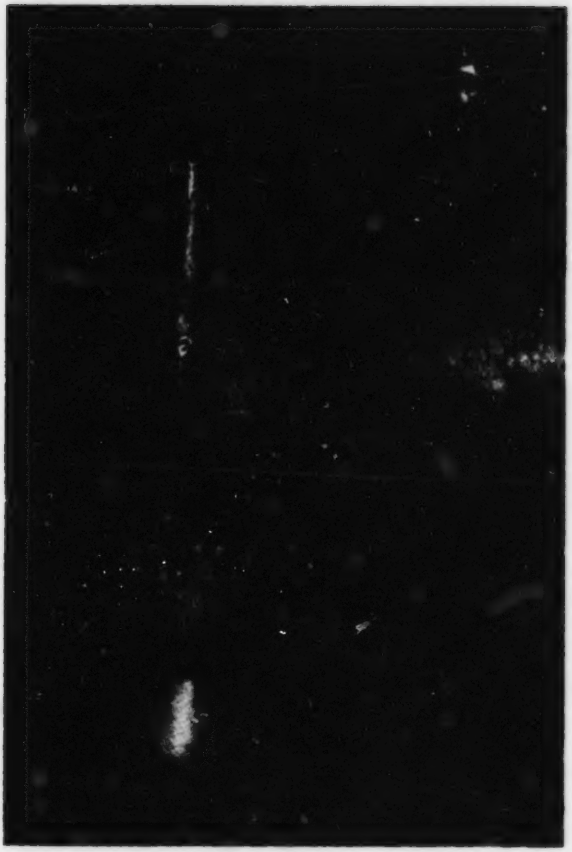
A cut made through these horizons exposes what is known as the soil profile. In agricultural practise it is often customary to refer to the different combinations of horizons as surface soil, subsoil and parent material. However, because many soils have more than three horizons or layers it is convenient to use the specific pedological terms, A horizon, B horizon and C horizon, which are further designated as Ah, A_1, A_2, B_1, B_2, C, etc. for more detailed and accurate descriptions where the main soil horizons are subdivided. These terms are used for the soil descriptions given in the appendix.

The A horizon is the horizon of maximum weathering and from which the bases are removed. In many soils the A horizon can be subdivided into A_1 and A_2. The A_1 horizon contains the largest amounts of organic matter and the A_2 is the horizon that has suffered the greatest amount of leaching or eluviation. Some of the materials leached from the A_2 accumulate in the B horizon and in this region, these accumulated compounds may be either organic materials or inorganic materials such as clay, or both. The result is that often the finest texture in the soil is located in the B horizon. The C horizon or what is more generally referred to as parent material, may be unaltered or only slightly altered by the soil forming processes.

Poorly drained soils or those in which ground water is present for a large part of the year, have a condition designated as "gley". The gley horizon is recognized chiefly by colour being bluish grey or with a concentration of yellow and red colours forming a mottled appearance.

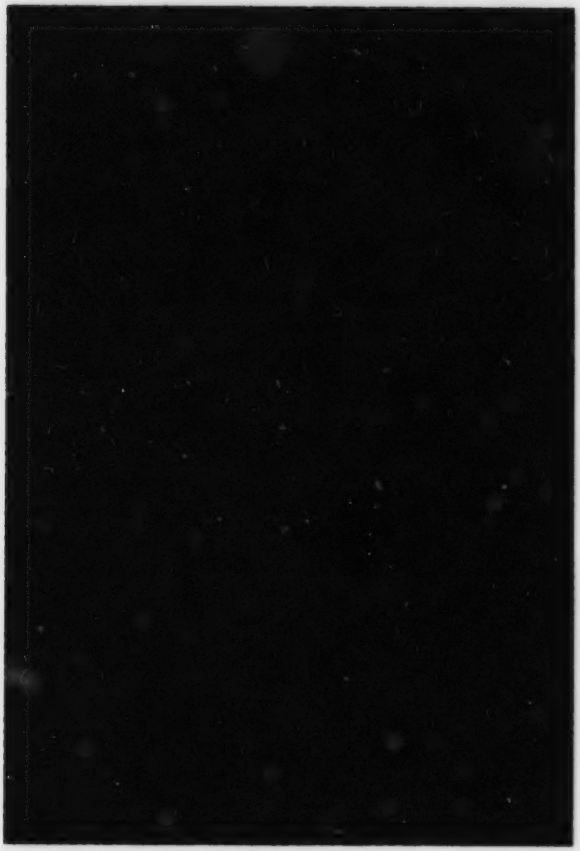
It is on the basis of the development of these horizons which make up the soil profile that the soils of a region are classified.

One of the principal classification units is the Great Soil Group. This unit commonly consists of a number of soils that differ greatly in texture but are similar in the kind and arrangement of their horizons. The following pictures and descriptions show the characteristics of the major Great Soil Groups occurring in this region.



A Grey-Brown Podzolic Soil Profile

In the southern part of the County the soil formation processes most commonly produce soils that have characteristics of the Grey-Brown Podzolic Great Soil Group. These soils have a dark greyish brown A_1 horizon 3 inches thick and relatively high in organic matter and underlain by a yellowish brown A_2 horizon that becomes lighter in colour with depth. The B horizon is brown in colour and contains accumulations of clay minerals and sesquioxides.



A Brown Forest Profile

The Brown Forest soils have developed in highly calcareous till materials. These soils have an A_1 horizon very dark brown in colour and high in organic matter. It is underlain by a brown B horizon containing little or no accumulation of sesquioxides or clay. In general the B horizon shows no colour subdivisions and the brown B carries down to the parent material at a depth of 12 to 18 inches. Base saturation throughout the solum is 100 per cent.

A Podzol Profile

The Podzol soils have an O horizon 1 to 2 inches thick which is underlain by a grey or white A_2 horizon varying from 1 to 2 inches in thickness. The B horizon is reddish brown grading to yellow-brown and contains accumulations of sesquioxides or organic matter or both.

A Dark Grey Gleysolic Profile*

The poorly drained mineral soils are classified as Dark Grey Gleysolic. These soils have a dark coloured surface high in organic matter and a greyish subsoil with yellow and orange mottling.

In very poorly drained positions where the organic matter accumulates at the surface to a depth over 12 inches, these soils are classified as Muck or Peat and are designated as organic soils.

* The spelling for gleysolic was changed from the former gleisolic after the maps for Hastings County had gone to the printers. Hence it appears in the map legend as Gleisolic.

Soil Series, Soil Types and Phases

There are three categories which are commonly employed in the classification of soils in the field.

They are (1) series, (2) type, and (3) phase.

The soil series includes all soils in an area developed from similar parent materials and that show the same genetic features in the profile but have some variation in texture, especially in the surface horizon. The series is given a geographical name, usually taken from the area where the series was first recognized and established — e.g. Otonabee.

The soil type is the mapping unit that consists of the series name plus the textural class name determined from the texture of the surface horizon, e.g. Otonabee loam.

A phase is a separation within a soil type based on some physical variation from the normal as in topography, stoniness, depth of bedrock, etc., which are important from a land use standpoint. Example, Otonabee loam — shallow phase.

SOIL KEY

A. Soils developed on glacial till

I. Moderately stony, calcareous, loam to sandy loam parent material

(a) Good Drainage

	Great Soil Group	Acreage
1. Bondhead sandy loam	G.B.P.	29,600
Bondhead sandy loam — steep phase	"	17,300
Bondhead sandy loam — stony phase	"	2,500
Bondhead loam	"	5,600
Bondhead loam — steep phase	"	300
Bondhead loam — stony phase	"	3,700
		59,000
2. Eldorado loam	"	8,100
Eldorado loam — steep phase	"	300
Eldorado sandy loam	"	1,500
		9,900
3. Otonabee loam	B.F.	30,200
Otonabee loam — steep phase	"	900
Otonabee loam — stony phase	"	6,100
Otonabee loam — shallow phase	"	200
Otonabee sandy loam	"	400
		37,800
(b) Imperfect Drainage		
1. Emily loam	B.F.	1,700
Emily loam — stony phase	"	100
		1,800
(c) Poor Drainage		
1. Lyons loam	D.G.G.	2,600
Lyons loam — stony phase	"	100
		2,700

II. Very stony, calcareous, loam to sandy loam parent material

	Great Soil Group	Acreage
(a) Good Drainage		
1. Dummer loam	B.F.	71,900
Dummer loam -- shallow phase	"	60,500
Dummer sandy loam	"	900
		133,300
2. Deloro loam	B.F.	8,900
Deloro loam — steep phase	"	1,300
Deloro loam — shallow phase	"	1,900
		12,100

III. Very stony non-calcareous till

(a) Good Drainage		
1. Monteagle sandy loam	P	59,600

B. Soils developed in lacustrine deposits

I. Calcareous clay

(a) Good Drainage		
1. South Bay clay	G.B.P.	5,700
South Bay silt loam — hilly phase	"	400
South Bay clay — rock outcrop	"	1,000
		7,100
(b) Imperfect Drainage		
1. Elmbrook clay	G.B.P.	11,900
Elmbrook clay — stony phose	"	200
Elmbrook silt loam	"	300
		12,400
(c) Poor Drainage		
1. Sidney clay	D.G.G.	42,900
Sidney clay — stony phase	"	100
		43,000

II. Calcareous clay underlain by calcareous loam till

(a) Good Drainage		
1. Waupoos clay	G.B.P.	5,000
Waupoos clay loam	"	400
		5,400
(b) Imperfect Drainage		
1. Solmesville clay loam	G.B.P.	12,500
(c) Poor Drainage		
1. Lindsay clay loam	D.G.G.	200
Lindsay clay loam — shallow phase	"	600
Lindsay clay loam — stony phase	"	500
Lindsay clay	"	1,500
		2,800

C. Soils developed on outwash

	Great Soil Group	Acreage
I. Calcareous sand over calcareous till		
(a) Good Drainage		
1. Dundonald sandy loam	G.B.P.	1,700
Dundonald sandy loam — stony phase	"	700
		2,400
II. Calcareous sand parent material		
(a) Good Drainage		
1. Tioga sandy loam	P/G.B.P.	17,500
Tioga sandy loam — stony phase	"	200
		17,700
(b) Imperfect Drainage		
1. Alliston sandy loam	P/G.B.P.	1,200
Alliston sandy loam — shallow phase	"	700
		1,900
(c) Poor Drainage		
1. Granby sandy loam	D.G.G.	6,500
III. Calcareous coarse gravelly parent material		
(a) Good Drainage		
1. Cramahe gravelly sandy loam	B.F.	6,100
IV. Non-calcareous sandy parent material		
(a) Good Drainage		
1. Wendigo sand	P	13,600
Wendigo sand — shallow phase	P	10,200
		23,800
2. Bancroft sandy loam	P	35,100
V. Non-calcareous gravelly parent material		
(a) Good Drainage		
1. St. Peter's gravelly sandy loam	P	9,900
VI. Calcareous sand over calcareous clay		
(a) Good Drainage		
1. Bookton sandy loam	G.B.P.	2,500
(b) Imperfect Drainage		
1. Berrien sandy loam	G.B.P.	1,200
(c) Poor Drainage		
1. Wauseon sandy loam	D.G.G.	300
VII. Calcareous fine sand		
(a) Good Drainage		
1. Percy fine sand sandy loam	G.B.P.	2,900
(b) Imperfect Drainage		
Trent fine sandy loam	G.B.P.	2,100
(c) Poor Drainage		
1. Foxboro fine sandy loam	D.G.G.	3,700

D. Soils developed in shallow materials over bedrock

(a) Variable Drainage		
1. Farmington loam	B.F.	40,500
2. Ameliasburg clay loam	B.F..	1,200
Ameliasburg clay loam — bouldery phase	"	200

E. Soils developed in recent alluvial deposits

(a) Variable Drainage		
1. Bottom land	R	11,100

F. Soils developed on organic materials

(a) Very Poor Drainage		
1. Muck	O	88,400
2. Peat	O	1,200
3. Peat over Marl	O	400

Miscellaneous Mapping Units

Marsh	5,600
Solmesville clay — Otonabee loam complex	4,900
Solmesville clay — Otonabee loam, stony phase, complex	4,400
Elmbrook clay — Otonabee loam complex	2,000
Bondhead loam, stony phase — Elmbrook clay complex	600
Bondhead sandy loam — Elmbrook clay complex	1,000
Sidney clay — Berrien sandy loam complex	1,100
Tweed sandy loam — Monteagle — muck complex	6,700
Rockland	711,700
Rock Outcrop	89,100

ABBREVIATIONS:

G.B.P.	— Grey-Brown Podzolic	P	— Podzol
B.F.	— Brown Forest	R	— Regosol
P/G.B.P.	— Bisequa, Podzol — Grey-Brown Podzolic	O	— Organic
D.G.G.	— Dark Grey Gleysolic		

TABLE 7

SOIL SERIES ARRANGED ACCORDING TO THEIR CATENARY RELATIONSHIP

Catena	Well Drained	Imperfectly Drained	Poorly Drained
Bondhead	Bondhead		Lyons
Eldorado			
Otonabee	Otonabee	Emily	Lyons
Dummer	Dummer		Lyons
Deloro	Deloro		
Monteagle	Monteagle		
South Bay	South Bay	Elmbrook	Sidney
Waupoos	Waupoos	Solmesville	Lindsay
Dundonald	Dundonald		
Tioga	Tioga	Alliston	Granby
Cramahe	Cramahe		
Wendigo	Wendigo		
Bancroft	Bancroft		
St. Peter's	St. Peter's		
Bookton	Bookton	Berrien	Wauseon
Percy	Percy	Trent	Foxboro
Farmington	Farmington		
Ameliasburg	Ameliasburg		

The catena is a grouping of soils developed on similar materials differing in drainage. The soils series mapped in Hastings County are arranged in Table 7 showing their catenary relationship.

BONDHEAD SERIES

The Bondhead soils occur in an area that has the form of a highland ridge. It extends from the southwest corner of the county to the northeast in the direction of Tweed. These soils are widely distributed throughout the south central part of Ontario.

They are well drained both externally and internally. The topography varies from moderately sloping to steeply sloping. The steeper slopes are not suitable for cultivation and are delineated on the soil map as steep phases.

The parent materials of the Bondhead soils are generally coarse in texture and the dominant soil type in the series is the Bondhead sandy loam.

In the uncultivated states these soils have a dark surface horizon, about 3 inches in thickness. The weathered part of the profile is deep and provides satisfactory conditions for root development.

Soil development has produced a soil that is typical of the Grey-Brown Podzolic Great Soil Group with a relatively deep A_2 horizon and a well developed textural B horizon.

In some cases sand and gravel bars are found along the slopes of the Bondhead soils but because of the scale of mapping have not been shown as a separate soil type.

The Bondhead soils ordinarily range in stoniness from slightly to moderately stony. In places where the stoniness exceeded this range the soil was designated as a stony phase.

The plow layer is dark colored and has a crumb-like structure with a sandy loam or loam texture. This surface layer is underlain by a grey A_2 or leached horizon with an average thickness of 12 inches, but on eroded slopes it may be much thinner or non-existent. If the solum is deep the upper part of the A_2 is yellow-brown in colour in contrast to the light brown colour of the lower portion of the horizon. The A_2 horizon is generally sandy loam in texture.

Underlying the A_2 is the B horizon which is dark brown in colour and contains accumulations of clay and sesquioxides. This horizon has a loam to clay loam texture and in contrast to the upper part of the profile tends to slow down the internal drainage. The grey loam or sandy loam parent material is found below the B horizon at a depth of approximately 24 inches. This unweathered material is stony and calcareous. Soil reaction varies from nearly neutral in the surface to strongly alkaline in the parent material.

The deeply weathered profiles are found on the upper slopes of drumlins. Much shallower profiles occur on the gentle slopes. Detailed descriptions and chemical analyses of these profiles will be found in the Appendix.

In several areas the Bondhead soils could not be separated on the map from Elmbrook clay loam. These areas were mapped as a complex of the two soils.

Utilization

The Bondhead soils are early soils and can be used for growing a wide variety of crops. This is a dairy farming area and clover, alfalfa, hay, fall wheat, oats and corn are the main crops grown. Cash crops such as peas and sweet corn are also grown on these soils in some areas.

The Bondhead soils rate with the best in the Province but they require careful management, particularly in connection with erosion control. The drumlins in

Profile of Bondhead sandy loam.

Sloping topography typical of Bondhead soils.

Hastings County are generally large with slopes ranging from 8 to 16 per cent. Many of these drumlins have lost all or most of their topsoil and are no longer cultivated. Farmers can no longer afford to mistreat their soil. Average yields on the Bondhead soils are low and must be raised if farm units are to operate profitably. Soil conservation techniques should be introduced on a large scale in Hastings County and the most severely eroded slopes kept under sod cover and regularly fertilized to get them back into profitable production. Contour cultivation on the lesser slopes of these soils will reduce soil losses and combined with regular applications of barnyard manure and other fertilizer supplements as determined by soil test will restult in substantially increased production.

Bondhead Sandy Loam — Steep Phase

Per cent slope has been the basis for establishing this phase and slopes over 15 per cent have been delineated on the map as steep phases. These slopes are too steep for cultivation and such areas are used for permanent pasture. A number of these steeply sloping areas have never been cultivated and remain under tree cover.

Serious soil losses occur on moderate slopes of the Bondhead soils. Strip cropping is recommended.

Bondhead Sandy Loam — Stony Phase

Large boulders are frequently present on Bondhead soils and such areas have been delineated as stony phases. The largest of such areas is mapped north of Halloway. About a mile north of this village the large boulders have been moved into the fence rows and the soil is under cultivation. In contrast, a mile south of Tuftsville, little improvement has been made and much of this area is still under tree cover.

Crops grown in the improved areas are comparable to those grown on the normal soils. Portions of the farms are often unimproved and used for pasture.

Courtesy of Dept. of Public Relations, O.A.C., Guelph, Ontario.

Strip cropping is designed to control erosion on long moderate to steep slopes.

ELDORADO SERIES

This series consists of soils developed on till derived largely from a laminated red and grey shale. The occur north of highway No. 7 in the Madoc, Eldorado, Marmora area.

The Eldorado soils are well drained and the topography is generally irregular, moderately sloping. In general the texture of the surface soil is a loam but in some areas a thin sandy loam deposit occurs on the surface. Two soil types have therefore been mapped, namely, Eldorado loam and Eldorado sandy loam.

In the uncultivated state these soils have a dark surface horizon. However, under cultivation much of it has been lost by erosion and the reddish coloured material below now shows up at the surface, particularly on the steeper slopes.

Soil development is typically that of the Grey-Brown Podzolic group with a relatively deep A_2 horizon and a well developed textural B horizon. The cultivated layer has a fair level of organic matter and a friable crumb structure. The A_2 or leached horizon underlying the surface layer is 8 to 10 inches thick and has a characteristic reddish colour inherited from the parent material. It may be loam or sandy loam in texture and quite permeable. The underlying B horizon is about 8 inches in thickness and has a clay loam texture. This horizon has an accumulation of clay and sesquioxides leached from the layers above. The parent material underlying the B horizon is a loam to clay loam till. It is reddish brown in colour and stony. Soil reaction is nearly neutral in the top horizons increasing to strongly alkaline in the parent material.

Utilization

These soils have much the same land use as the Bondhead soils. They are good agricultural soils and suitable for the growing of a wide variety of crops. Like the Bondhead soils the use of phosphatic fertilizers will probably be necessary for the production of hay and grain.

Eldorado Loam — Steep Phase

This mapping unit represents areas in which the topography is rougher than normal. The slopes are short and the landscape pattern suggests dissection by water. Most of these areas are under cultivation and produce good crops. The short steep slopes are subject to damage from water erosion.

Eldorado Sandy Loam

The Eldorado sandy loam has been mapped in one area north of Madoc. It has a sandy loam texture in the upper part of the profile. The topography is gently sloping. The profile characteristics are similar to those described previously under Eldorado loam.

This is a good soil for growing the crops generally produced in Hastings County. It is an early soil and easy to work. In productivity it is comparable to the Bondhead sandy loam.

OTONABEE SERIES

The Otonabee soils occur in Rawdon, Huntingdon, Thurlow and Tyendinaga townships. They are important soils in Central Ontario being widely distributed in several counties.

These soils are well drained both externally and internally. The average soils have a moderately sloping topography. In Rawdon township some of the Otonabee soils have irregular steep slopes and are mapped as a steep phase.

The soil parent material consists of a loam to sandy loam textured glacial till containing a moderate amount of stones. This material is calcareous since it is derived principally from limestone rock. In general the texture of the surface is a loam but in some cases it is a sandy loam. Two types have therefore been mapped namely, Otonabee loam and Otonabee sandy loam.

In the uncultivated state these soils have a thick and dark coloured surface. In cultivated fields much of it has been lost through erosion and the lighter coloured material below now shows up at the surface, particularly on the steeper slopes. As the finer material is removed by water, the surface also becomes more stony.

Soil development shows some of the characteristics of both the Brown Forest Great Soil Group and the Grey-Brown Podzolic soils. A thin A_2 horizon of the latter soils may be encountered. There is generally a thin but definite textural B_2 horizon. The thin solum is one of the prominent characteristics of this soil compared with similar textured soils occurring in the southern part of the Province.

The cultivated surface has a friable granular structure and is alkaline in reaction. The B horizon is about 8 inches thick. This horizon is brown in colour and generally has an accumulation of clay in the lower half. Free carbonates occur in this horizon. The unweathered grey calcareous parent material occurs below the B horizon at a depth of 12 to 15 inches below the surface.

Utilization

These soils are used for the growing of a wide variety of crops. Since the surface soils are friable and have granular or crumb structure they are easy to cultivate. In Hastings County the Otonabee soils are used for dairy farming. Although some cash crops such as winter wheat are grown, the principal crops are hay and oats. Both ensilage corn and grain corn can be successfully grown on the lower slope classes of the soils.

Otonabee Loam — Steep Phase

The steeper sloping areas of Otonabee were mapped out as "steep phases". These areas have slopes in excess of 15 per cent. They may occur on the sides of some drumlins in the Stirling area or form a more complex pattern of irregular slopes in the limestone till area of Rawdon township. Many of these areas are cleared and used for permanent pasture.

Otonabee loam - steep phase. The upper slopes of this drumlin require shrub and weed control for better pasture.

Otonabee Loam — Stony Phase

This phase is usually found in areas adjacent to the very stony Dummer soils. The number of stones found on this phase places the soil in the very stony category. The topography is generally moderately rolling. The profile features of the soil are similar to those already described for the series.

The utilization of this phase for agriculture is seriously hindered by the stoniness. However, considerable areas have been cleared sufficiently to permit cultivation and good crops of hay and grain can be grown. Many areas have not been cleared and these can only be used as pasture land.

Otonabee Loam — Shallow Phase

This phase has been mapped in locations where the Otonabee soils are underlain by limestone bedrock at depths ranging from 12 to 24 inches. These soils can be cultivated but have little "drought resistance" and crops frequently suffer from lack of moisture during the season. Thus crop yields are invariably lower than for the normal Otonabee soils.

EMILY SERIES

The Emily soils are imperfectly drained and occur in association with the Otonabee soils.

These soils have gentle sloping topography and are found on the lower slopes of hills and ridges. As a consequence, they receive surface run-off from the higher land and may be water saturated for a considerable part of the year.

The surface horizon in the uncultivated state is a thick (4 inches) dark coloured horizon, high in organic matter. This organic material improves the physical characteristics of the soil and is a source of plant nutrients.

Profile development has been less pronounced than on the Otonabee soils and they have the more consistent morphological characteristics of the Brown Forest Great Soil Group. The cultivated surface layer is 6 inches thick, has a loam texture and a very dark brown colour. It has a friable granular structure and is neutral in reaction. The underlying brown B horizon is 6 to 8 inches thick, mottled, and may have some accumulation of clay in the lower part of the horizon. Although of fine texture, the layer is friable and the soil reaction is alkaline. The grey calcareous parent material underlies the B horizon and is loam to clay loam in texture and moderately stony.

Utilization

Emily loam is considered to be a good soil for the production of clover and timothy hay, ensilage corn and pasture grasses. The yields of spring grains may be poor in seasons of high rainfall but in normal seasons the drainage is sufficiently good to permit these crops to mature. Tile drainage will greatly improve the soil condition for growing crops.

Emily Loam — Stony Phase

This phase has all the characteristics of the Emily soils but it has a great many more surface stones. Most of the stones are removable.

LYONS SERIES

The Lyons soils are poorly drained and have the same parent material as the Bondhead and Emily series. They occupy the level or slightly depressional areas between the drumlins and the water table is high for many months of the year. Since these soils are saturated with water they tend to develop a deep dark surface containing large amounts of organic matter. The subsoil is grey and mottled and lacks the horizon development characteristic of the better drained soils. These are classified as Dark Grey Gleysolic soils.

The surface layer on cultivated soils is deep, ranging from 7 to 9 inches. It has a high percentage of organic matter giving it a very dark colour and a

friable crumb structure. It is neutral in reaction. Underlying the surface layer are mottled grey loamy horizons neutral to alkaline in reaction and quite friable in consistence. Grey calcareous stony parent material is found at 18 to 20 inches from the surface.

Utilization

The Lyons soils are not used to any extent for the growing of cultivated crops. Most areas are used as permanent pasture or left in woodlots. The chief problem connected with the Lyons soils is that of drainage. Underdraining is difficult because of the large number of boulders in the subsoil.

Lyons Loam — Stony Phase

This phase as mapped in Hastings County is very stony and unsuitable for cultivation. It is presently used for permanent pasture or woodlots.

DUMMER SERIES

This series which occupies 133,300 acres represents about 2.2 per cent of the total land area of the county. Of this total, 71,900 acres are mapped as Dummer loam, 60,500 acres as Dummer loam — shallow phase, and 900 acres as Dummer sandy loam. These soils are found chiefly in Tyendinaga, Hungerford, Huntingdon and Rawdon townships. Large areas of the Dummer soils are also found in the nearby counties of Peterboro, Northumberland, Victoria, Lennox and Addington.

These soils are well drained and the topography varies from moderately to steeply sloping or hilly where the soil material is deep over the bedrock, to undulating on the shallow phase.

In the uncultivated state these soils have a dark surface horizon high in organic matter. The weathered part of the profile is thin and the development is characteristic of the Brown Forest soils of Ontario. The surface layer in uncultivated areas is 3 to 4 inches thick. It is very dark grey to black in colour and has a friable crumb structure. When separated from the stone the texture may be loam or sandy loam. Free carbonates are present in the surface horizon.

A landscape of Dummer loam, cleared and uncleared areas in the foreground.

The friable brown B horizon is about 6 inches thick, and may contain accumulations of sesquioxides and clay. It often has a clay loam texture. Free carbonates are also present in this horizon. The unweathere parent material occurs at 9 to 12 inches beneath the surface and directly below the B horizon.

Utilization

The Dummer soils are mainly used for pasture crops. Some of this land was cultivated in the days of early settlement, and stone removal improved some areas considerably. Often the stones were too numerous to be removed completely and this together with the rough topography has resulted in the abandonment of most of these farms. These soils have only a medium level of natural fertility but provide good pasture if weeds are controlled.

There is little likelihood of much future development of these soils except for grazing purposes. With weed control and fertilization the carrying capacity for livestock can be greatly increased.

DELORO SERIES

Deloro soils are very stony and are developed in materials derived from red and grey calcareous shale. These soils have been mapped only in Hastings County and occur in the Deloro - Madoc area.

These soils are well drained and the topography is hilly. Some outcropping of Precambrian rocks occur with this series. The soil parent material is a stony, calcareous, reddish brown till.

The soil profile has characteristics of the Brown Forest soils of Ontario. The surface soil is dark brown, loam to sandy loam in texture about 4 inches thick and has a crumb structure. Free carbonates are generally present in this horizon. The underlying B horizon is about 6 inches thick and is dark brown to dark reddish brown in colour. It ranges in texture from a loam in the upper part to clay loam in the lower part of the horizon. This horizon has good aggregation and is friable. Free carbonates are present. The unweathered material occurring below the B horizon is a calcareous reddish brown loam.

Utilization

The Deloro soils are used chiefly as grazing land.

Deloro Loam — Steep Phase

This soil is found within the Precambrian rock area and reflects the rough landscape pattern associated with the Precambrian rock outcroppings. This soil has a lower rating as pasture land than the normal Deloro loam.

Deloro Loam — Shallow Phase

The shallow phase of Deloro loam consists of a thin soil cover over Precambrian rocks. It is inferior to Deloro loam as pasture land but is used for this purpose.

MONTEAGLE SERIES

The Monteagle soils are found within the Precambrian Shield and are widely distributed through North Hastings, Renfrew, Haliburton, and Parry Sound. They occupy 59,600 acres or 4 per cent of the county area.

These soils are well drained. The topography is variable but dominantly irregular moderately to steeply sloping. Rock outcroppings are few to many in the areas mapped as Monteagle. The series also occurs as a minor constituent in the large area mapped as Rockland.

The soil parent material consists of a gravelly sandy loam glacial till containing a high percentage of stone. This material is non-calcareous since it is derived from non-calcareous Precambrian rock. The surface texture is sandy loam.

These soils are generally very stony on the surface as shown in the accompanying picture. For this reason cultivation is very limited and individual areas are small.

In the virgin or undisturbed state these soils have an organic layer 1 or 2 inches in thickness underlain by a whitish horizon 1 to 2 inches in thickness. Underlying this layer is a reddish brown horizon. The upper portion is 9 to 10 inches thick and dark reddish brown in colour. It has crumb structure and is friable. There is abundant root development in this horizon. Iron oxides have accumulated in this layer and account for some of the reddish colour. The colour fades with depth through 8 to 10 inches into the olive coloured very stony parent material.

Utilization

These soils are associated in a landscape pattern with numerous outcroppings of Precambrian rock. The topography is complex and hilly. Farming on these soils at present consists of a combination of forestry and agriculture. Most of the

Landscape scene on Monteagle sandy loam.

livestock breeds are beef cattle which graze in cleared and uncleared areas. Because of the small proportion of cultivated land and low yields obtained, cattle are usually sold for feeders and are not finished for marketing. Field crops such as hay and oats require lime and fertilizer for economical returns. Pasture fields require brush and weed control.

SOUTH BAY SERIES

The largest acreage of the South Bay soils occur in the Stirling area. In these soils the external drainage is generally good while internal drainage is slow. The topography is moderately sloping. Two miles south of Minto there are several hundred acres which are steeply sloping.

These soils have a well developed profile with features of the Grey-Brown Podzolic soils. The cultivated surface is about 6 inches thick, with a dark grey-brown colour and a clay texture. This soil is friable but can be very cloddy if cultivated when moisture conditions are too wet or too dry. Soil reaction is slightly acid. All horizons are stone-free. The leached or A_2 horizon occurring below the surface layer is grey-brown in colour, has a clay texture and a laminated structure, is slightly acid and has a thickness of about 10 inches. The B horizon which occurs directly below the A_2 is dark grey-brown in colour, 8 inches or

Profile of South Bay clay.

more thick and of a firm blocky structure. Soil reaction is neutral in this horizon. Below the B there is a grey-brown layer 3 ot 6 inches thick which has the characteristics of parent material but contains few if any free carbonates. Below this layer, free carbonates are present in the grey clay.

The South Bay soil has 40 to 50 per cent of clay in the surface increasing to 70 per cent and higher in the parent material.

Utilization

The South Bay soils are perhaps the most productive farm soils in the County. They produce good yields of hay, spring grain and fall wheat. All of these soils have been cleared and are used for farming. The cultivation of these soils must be regulated by the moisture content. If cultivated when wet they produce a cloddy condition that persists for the remainder of the season. Liberal amounts of organic matter applied in the form of barnyard manure will help to provide an open friable surface.

South Bay Silt Loam

An area lying north and east of Belleville has been mapped as South Bay silt loam. The profile is similar to the South Bay clay but the upper 6 to 10 inches of the solum is a silt loam.

The westerly half of this area is dissected by a meandering stream course which has many short steep slopes and which are suitable for pasture. The easterly half has smooth gentle slopes which are more suitable for cultivation.

South Bay — Rocky Phase

This area of clay soils occurs within the Precambrian shield and numerous outcroppings of bedrock occur within the mapped area.

This phase provides good pasture but only small areas are suitable for cultivation.

ELMBROOK SERIES

The Elmbrook soils are important agricultural soils in Hastings County. They are found chiefly in the Belleville and Stirling areas. Elmbrook clay is the major soil type but a small area of Elmbrook silt loam is also mapped northeast of Belleville.

The Elmbrook soils are developed on stone-free calcareous clay, the percentage of clay in the parent material being in the range of 75 to 80 per cent. The topography is gently sloping, providing some surface drainage, but the internal drainage is slow and these soils are therefore imperfectly drained.

The cultivated surface of the Elmbrook is 5 to 6 inches thick, very dark brown in colour and generally has friable consistence. During dry summer weather it is inclined to bake and crack. Soil reaction is neutral. The A_2 horizon directly below the surface layer is thin (3-4 inches). It has a dark grey-brown colour and is usually slightly mottled. The angular blocky aggregates are larger than in the surface horizon and have a firm consistence. Soil reaction is neutral. The B horizon is about 6 inches thick, is dark brown in colour, mottled, and has large blocky aggregates which have a hard consistence. The upper part of the material below the B for a depth of 6 to 10 inches has been leached of free carbonates. The parent material is stone-free and dark grey in colour.

Gently undulating topography characteristic of Elmbrook soils.

In some areas of Elmbrook soils small ridges of Otonabee loam occur which at the scale of mapping cannot be delineated. These areas were mapped as a complex comprising the two soils.

Utilization

All the Elmbrook soils are under cultivation and are used chiefly for hay and grain crops. Hay crops include a mixture of alsike, red clover, and timothy. High yields of spring grains and fall wheat can be obtained in years of normal rainfall but yields are much lower in wet seasons.

Elmbrook Clay — Stony Phase

This soil occurs as small isolated lacustrine clay areas intermingled with stony till. A large number of boulders are distributed over the surface but are not buried deep in the soil. When cleared of stone the land use on this soil is similar to the Elmbrook clay.

Elmbrook Silt Loam

Elmbrook silt loam was mapped in one location north and east of Belleville. This soil occurs in association with an area of South Bay silt loam and both soils have a surface layer of loam to silt loam material overlying finer textured clay. The topography is very gently sloping.

The plow layer of this soil is very friable and it is an easier soil to work than the clay type. The Elmbrook silt loam should produce good to fair crops of hay (clover, timothy) and spring grains. Good crops can be expected in seasons of normal rainfall but in wet seasons or in cold late springs much lower yields may be obtained.

Plowing down grasses and clovers is good practice on clay textured soils.

SIDNEY SERIES

The Sidney soils are poorly drained clay soils. There are 43,000 acres of the series mapped in the county, the greater part of it occurring in Sidney and Tyendinaga townships. The topography is nearly level and in some cases slightly depressional.

The parent material of the Sidney series is a calcareous stone-free clay. The profile development is Dark Grey Gleysolic. The plow layer is approximately 6 inches thick and very dark grey in colour. Surface reaction is neutral. This layer can become very cloddy if plowed when it is too dry or too wet. The subsoil is brown to grey-brown and mottled. It is massive and only slowly permeable to water. The parent material is a light grey calcareous clay. The percentage of clay varies from 45 per cent in the surface to 80 per cent in the parent material.

A complex of Sidney clay and Berrien sandy loam was mapped near the western boundary of Belleville. The Berrien soil occurred in such small areas here that it was impossible to delineate it on the map.

Utilization

In this region of Eastern Ontario, hay is the principal crop produced on these level clay plains. For this purpose poorly drained soils produce probably as well as the better drained clay soils for such crops as alsike, red clover and timothy. The winter killing of alfalfa, however, has been observed to be the most severe on the clay soils in poorly drained positions.

If it is desired to improve the crop adaptability of these soils in the future, the installation of tile drainage systems should be investigated. In other parts of the Province this method of drainage has proved to be an economical procedure. In the absence of tile drainage much of the surface water that collects in the spring can be removed by means of shallow ditches. It is doubtful that if such

artificial drainage systems were installed, that Sidney clay could be made adaptable for the production of winter wheat, since it would not prevent losses by winter killing.

Sidney Clay — Stony Phase

This phase has been mapped in close association with stony upland soils and surface stones or boulders are fairly numerous.

The small area mapped is used for pasture.

Sidney clay occurring in areas having level to slightly depressional topography.

WAUPOOS SERIES

The Waupoos soils are composed of a thin deposit of lake laid clay overlying a stony till. This surface layer of clay varies in depth within short distances so that in some locations it is only of plough depth and in other locations it may be 18 inches thick. Occasionally the clay deposit is absent and the somewhat stony till then occurs at the surface.

These soils have a gently sloping relief and moderately good surface drainage. The internal drainage is not as good since water moves slowly through these tight clay soils particularly in areas with low relief. The drainage, however, has been sufficiently good to permit some soil development, and the series is classified as Grey-Brown Podzolic.

The cultivated surface consists of a dark brown coloured soil with a clay or clay loam texture. In general these soils do not have as cloddy a surface as some other clay soils in the district and less caution is perhaps required in order to produce a satisfactory seed bed. The soil reaction is neutral. The profile consists of a grey-brown A_2 horizon 5 inches thick, followed by the clay textured B horizon which is about 8 inches in thickness and has a blocky structure. This horizon also has a neutral reaction. The thickness of the solum varies with the thickness

of the clay deposit since the lower depth of the B horizon usually occurs at the junction between the clay and the underlying till.

Utilization

The Waupoos soils have good natural fertility and produce good yields of the crops commonly grown in the Country. Hay, including clover and alfalfa, fall wheat, spring grains and some corn are the crops normally grown.

These soils can be kept in good tilth by incorporating adequate amounts of organic matter.

SOLMESVILLE SERIES

The Solmesville soils occur chiefly in Thurlow and Tyendinaga townships. The series is also mapped in Prince Edward County. These soils have very gently sloping topography and the drainage conditions within the soil are imperfect. These soils are found in association with the Waupoos, Otonabee and occasionally with the Elmbrook and Sidney series.

The soil is developed in a stone-free clay which varies from 1 to 2 feet in depth and overlies a stony till. The Solmesville series is classified as a gleyed Grey-Brown Podzolic soil.

The Solmesville clay loam has occurred in some areas in such close association with Otonabee soils that it was necessary to map these areas as a complex containing the two soil series.

The cultivated surface layer is 6 to 7 inches thick, friable, dark-brown in colour having a clay or clay loam texture. It is neutral in reaction. This layer is underlain by a dark grey-brown A_2 horizon about 4 inches thick. This layer has a firm consistence. The B horizon is about 4 inches thick and very dark-brown

Oval shaped hill or drumlin surrounded by level clay plains. The soil on the hill is Bondhead sandy loam and the surrounding area, Solmesville clay.

in colour. It contains accumulations of clay and sesquioxides. It is mottled, firm in consistence and free carbonates are present in the lower part of the horizon. The underlying till is grey-brown, calcareous stony loam to clay loam.

Utilization

The Solmesville series are good soils for general farming. They are used for the production of hay and grain crops. Timothy, alsike and red clover do well on these soils and they are fairly dependable for wheat, oats and silage corn.

LINDSAY SERIES

The Lindsay soils occur in association with the Waupoos and Solmesville and have a nearly level topography.

These soils have developed in shallow clay to clay loam lake deposits that overlie a stony loam or clay loam till. Drainage conditions are poor. The soil is saturated with water for considerable periods producing mottled gleyed horizons in the profile.

The cultivated surface is 6 inches thick, very dark grey in colour and of clay or clay loam texture. The underlying gley layer is 6 to 12 inches thick. pale brown in colour and mottled. Free carbonates are generally present in the lower part of the horizon. The gley horizon is underlain by grey stony loam to clay loam till that is calcareous and mottled.

Utilization

The larger areas of these soils are used mostly for hay and pasture. Small areas of Lindsay soils occurring in cultivated fields along with better drained soils are usually cultivated but yields of grain crops may be very poor in wet seasons.

Lindsay Clay Loam — Shallow Phase

In this soil, limestone bedrock underlies the clay sediments at a depth of about 2 feet.

The soil produces good pasture but drainage improvement is difficult because of the proximity of the rock.

Lindsay Clay Loam — Stony Phase

This phase is a boulder strewn area of Lindsay soils. Such areas can be cleared and used for the production of hay and pasture.

DUNDONALD SERIES

The Dundonald soils have developed from a deposit of sandy loam outwash overlying stony calcareous till. These soils have gently to moderately sloping topography, and are well drained. The depth of the sandy overburden varies from 18 to 30 inches. In some areas wind and water erosion have removed practically all of the sandy overburden.

The cultivated surface is dark grey in colour, very friable, and is slightly acid in reaction. Its texture is sandy loam. The upper part of the A_2 horizon is yellowish brown, about 6 inches thick, very friable and slightly acid in reaction. The lower

part of the A_2 horizon is pale brown and has a platy structure. The overall depth of the A_2 is about 18 inches and the texture is sandy loam. The B horizon is 2 or 3 inches thick. It is dark reddish brown in colour, loam textured, and friable. The underlying till is a calcareous loam or sandy loam.

North of Marmora the area mapped as Dundonald sandy loam is underlain by reddish stony till derived from Pamelia limestone. In other areas the underlying material is grey calcareous till. The Pamelia limestone has a fairly high magnesium content.

Utilization

Dundonald sandy loam is a good agricultural soil. It is early and has many good features when compared with other soils such as freedom from stones, easy to cultivate, and has good moisture retention properties. This soil will grow a wide range of the crops generally grown in the area provided the fertility requirements are met. It requires regular applications of barnyard manure and nitrogen, phosphorus and potassium fertilizers to ensure good yields.

Dundonald Sandy Loam — Stony Phase

This soil is mapped near Oak Lake and has a considerable quantity of large boulders on the surface. Land use is similar to that described for Dundonald sandy loam.

TIOGA SERIES

The Tioga Series covers an area of 17,700 acres. It occurs in the southern part of the County in Huntingdon, Thurlow, Sidney and Tyendinaga townships.

The Tioga soils have a gently to moderately sloping relief and only occasionally are slopes steep. These latter areas have been mapped as Tioga — steep phase.

The texture in these sand deposits ranges from coarse to fine but in the main consists of calcareous medium sand. The surface soil is acid and a Podzol profile has developed in the upper layers. A thin textural B horizon occurs at the junction with the calcareous parent material.

The cultivated surface is grey-brown in colour, 6 inches thick, and very friable. Soil reaction is moderately acid. The Podzol B horizon is about 5 inches thick and is strong brown in colour. It is acid in reaction. The Grey-Brown Podzolic B is 2 to 4 inches thick, sandy loam in texture, and friable. It is neutral in reaction. The parent material is grey calcareous sand.

Utilization

Much of the Tioga mapped in the County is used for growing both general farm and canning crops. It is only fair for hay and spring grains but is a good soil for tomatoes, sweet corn and potatoes. This soil requires regular applications of barnyard manure, nitrogen, phosphorus and potassium to ensure good yields.

Tioga Sandy Loam — Stony Phase

This soil has been mapped in areas where boulders are found on the surface. In some cases they may offer some obstruction to cultivation but do not prevent it. Utilization is similar to the sandy loam series described above.

ALLISTON SERIES

The Alliston soils cover an area of 1,900 acres in Hastings County. This series is imperfectly drained and is associated with the better drained Tioga soils. The soil parent materials are calcareous sand. The topography is gently sloping. During certain parts of the year the water table is high and tends to produce an imperfectly drained soil.

The uncultivated soil has a dark surface horizon and the underlying horizons are typical of the Podzol profile in the upper part of the solum, but in its lower portions has the A_2 and B horizons of the Grey-Brown Podzolic soils.

The cultivated surface is sandy loam, very dark grey in colour, has a crumb structure, and is neutral in reaction. The Podzol B horizon is 8 inches thick, loamy sand texture, light yellowish brown in colour, and slightly acid in reaction. The C horizon of the Podzol profile is 8 or 9 inches thick, grey in colour, mottled, and nearly neutral in reaction. This is underlain by a Grey-Brown Podzolic B horizon 3 to 4 inches thick, light yellowish brown in colour, very mottled, and neutral in reaction. The unweathered material occurs at 24 to 26 inches from the surface, it is pale brown in colour and a calcareous medium grained sand.

Utilization

This soil is suitable for the production of canning and vegetable crops. Fair crops of hay and grain may also be obtained.

Alliston Sandy Loam — Shallow Phase

This soil has developed on outwash sand deposited on flat limestone rocks. The sandy overburden ranges in depth from 15 to 20 inches.

The profile is similar to the Alliston sandy loam in number and arrangement of horizons and colour.

This soil is droughty in the hot summer months and low yields of crops may be expected.

GRANBY SERIES

The Granby soils are neutral to alkaline sandy soils with poor natural drainage. The topography is smooth or depressional.

The surface soil of the cultivated fields is a very dark brown to grey-brown sandy loam. The percentage of organic matter in this layer is commonly 6 to 10 per cent and well incorporated with the mineral portion. In spite of the high level of organic matter this soil is generally low in available plant nutrients.

The light grey sand underlying the surface horizon provides a striking contrast in colour to the surface soil. The grey colour of the subsoil is the result of anaerobic conditions brought about by prolonged periods when the water table is at or near the soil surface. Some profiles exhibit extreme mottling in the zone of a fluctuating water table. In other profiles this mottled horizon may be absent.

Utilization

Very little of the Granby sandy loam is cultivated but remains in woodlots or in permanent pasture. It is well suited to the commercial production of grass sod.

Profile of Granby sandy loam.

CRAMAHE SERIES

The Cramahe soils are coarse textured excessively well drained soils developed on a moderately to steeply sloping terrain. They have a scattered distribution within the County. The gravel ridges though often extending for considerable distances are narrow and frequently broken up sags or level gaps. One of the longest of these gravel ridges in Hastings County can be followed from Halston in a northeast direction to Marlbank and thence to Beaver Lake in Lennox and Addington County.

The virgin profile exhibits the characteristics of the Brown Forest soils. The profile consists of a very dark brown surface containing 4 to 5 per cent organic matter underlain by a brown to reddish brown subsoil. The combined thickness of these two horizons may vary from 7 to 12 inches. The parent materials below the subsoil are coarse cobbly gravel.

Utilization

Grazing is about the only agricultural use of this soil. It has a very low moisture holding capacity and there is very little plant growth during July and August. The Cramahe soils are more important to their owners as a source of revenue for the sale of road building materials.

WENDIGO SERIES

There are 33,800 acres of Wendigo soils mapped in the County and there is a considerable acreage of these soils mapped across the northern parts of Ontario, Peterborough and Renfrew Counties. They take their name from similar soils mapped in Northern Ontario.

The Wendigo soils are well drained and are found on gently to moderately sloping topography.

In the uncultivated state they have well developed Podzol profiles. The virgin soil consists of a loose covering of coniferous needles, moss, etc. This is underlain by a white A_2 horizon 2 inches thick, and having a loose sand texture. This horizon is strongly acid. Underlying this horizon is the B_2, which is 4 or 5 inches thick, very dark grey-brown in colour with a sandy loam texture and crumb structure. This horizon is strongly acid. The B_2 horizon grades into a B_3 horizon which is dark yellowish brown in colour; about 5 inches thick and sandy loam in texture. It is strongly acid in reaction. This horizon grades into a C_1 horizon about 6 inches thick; with a sand texture and single grain structure.

The pale brown coarse parent material occurs about 18 inches from the surface and is non-calcareous.

Utilization

The Wendigo soils that occur in Hastings County are not suitable for agriculture. They are very low in natural fertility and very droughty. Forestry is perhaps the best land use for these soils.

Wendigo Sandy Loam — Shallow Phase

Areas in which non-calcareous sandy outwash is deposited on limestone bedrock have been mapped as shallow phase of the Wendigo series. The depth of sand varies from 12 to 24 inches with occasional shallower or deeper deposits.

Land use is restricted to non-agricultural pursuits such as growing Christmas trees and forestry.

BANCROFT SERIES

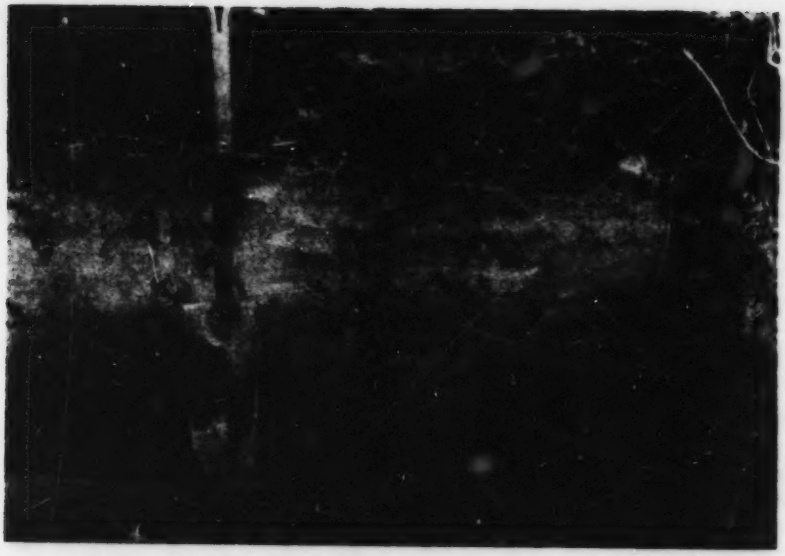
The Bancroft soils were first mapped in North Hastings County and are found east of Bancroft towards MacArthur Mills. They occur among the Precambrian rocks which dominate the topography of the region.

The soil materials are non-calcareous fine sands, finer in texture than the Wendigo soils of the area. Good drainage is provided both by the nature of the materials and the moderately to steeply sloping topography.

The Bancroft soils have weak Podzol development, the ashy leached horizon is generally completely destroyed under cultivation. In virgin locations the leached whitish horizon varies from 1 to 2 inches in thickness and is continuous. The subsoil is yellowish red and is high in organic matter content.

Utilization

In the early history of the County the Bancroft series was referred to as the white pine soils and undoubtedly they have produced large crops of timber. There are some farms on these soils but the numerous outcroppings of granite interfere with cultivation. Crops such as rye, oats, buckwheat, hay and potatoes are grown but a large acreage of the series remains in forest.



Profile of Bancroft sandy loam showing fine sandy loam materials.

Buckwheat and corn on Bancroft sandy loam. These soils are also found in the forested areas.

ST. PETER'S SERIES

The St. Peter's soils are found in the northern part of the County within the Precambrian Shield. They occur on nearly level to undulating topography and the drainage is good as a result of the coarseness of the soil materials. The soil parent materials consist of non-calcareous gravel.

The profile characteristics are those of a Podzol but the leached A_2 horizon is very thin and along road cuts is readily seen when the soil is dry but is quite inconspicuous when the soil is moist. The subsoil is reddish brown and friable. The profile has developed in a sandy loam overburden which may vary in depth from 7 to 15 inches.

Landscape and road cut on St. Peter's gravel.

Utilization

These soils are used in a limited way for agriculture but are low in natural fertility, acid in reaction and droughty. The St. Peter's soils would appear to be more suitable for forestry than for agriculture.

BOOKTON SERIES

The Bookton soils are developed on sandy outwash, a deposit that is 1 to 3 feet thick overlying stone-free calcareous clay. Bookton sandy loam is mapped in the northern part of the County west of Foxboro.

The profile developed in the sand has the characteristics of the Grey-Brown Podzolic soils, the horizon of accumulation occurring at the sand-clay junction.

The cultivated surface is about 6 inches thick, is a very dark grey sandy loam and is very friable. The surface soil reaction is slightly acid to neutral. The A_2 horizon is 12 to 16 inches thick and generally can be divided into a

yellowish brown A_{21} and pale brown A_{22}. The B horizon is a brown clay horizon about 6 or 7 inches thick in the upper part of the underlying clay.

Utilization

Bookton sandy loam is used both for fruit production and general farming. It is a good soil for tree fruits and also for small fruits and vegetables. It is a fair soil for general farm crops.

BERRIEN SERIES

The Berrien soils are developed on sandy outwash, a deposit that is less than 3 feet thick overlying calcareous clay. The depth of sand varies but has an average thickness of 18 inches. These are imperfectly drained soils.

In uncultivated areas the Berrien soils develop a 4 to 5 inch surface horizon rich in organic matter. In cultivated fields the surface horizon is plow depth and very dark grew in colour. It is neutral in reaction. The A_2 horizon consists of a yellowish brown sandy loam that is generally slightly mottled. The horizon of accumulation is found in this series at the sand-clay juncture. It is brown in colour and may be loam or clay in texture depending on the degree to which it has penetrated the clay deposit.

Utilization

Berrien sandy loam is suitable for small fruits and vegetables but less suitable for large tree fruits. It is fair soil for hay and general farm crops.

WAUSEON SERIES

The Wauseon soils are developed on sandy outwash materails, less than 3 feet thick, overlying stone-free calcareous clay. The depth of the sand deposit ranges in depth from 1 to 2 feet.

The Wauseon soils are found on nearly level topography with the consequence that there is little or no surface drainage. They are poorly drained and the profile has the characteristics of the Dark Grey Gleysolic soils.

The surface of the uncultivated soil is nearly black and 6 inches or more thick. In cultivated fields it is generally a very dark grey in colour and may be 6 to 9 inches thick. The surface texture is a sandy loam and is very friable. The horizons below the surface are gleyed and may or may not be divisible into more than one horizon. In some profiles intense mottling may be found first above the underlying clay. The texture of the outwash material beneath the surface is generally a sand having single grain structure. Soil reaction is alkaline throughout and free carbonates may be encountered at the surface.

Utilization

These soils are presently used for permanent pasture and woodland. If drainage improvement can be accomplished the Wauseon soils will then approach the Bookton or Berrien soils in productivity.

PERCY SERIES

The Percy soils cover an area of 2,900 acres and are developed from calcareous fine sands.

The topography is moderately sloping and both external and internal drainage is good. The profile characteristics are those of the Grey-Brown Podzolic soils.

The cultivated surface is about 6 inches deep, very dark grey in colour, fine sandy loam in texture, and neutral in reaction. The A_{21} horizon is 5 inches thick, yellowish brown in colour, fine sandy loam in texture, and slightly acid in reaction. The horizon grades into the A_{22} which is about 8 inches thick, and light yellowish brown in colour. The horizon has weak platy structure, and is slightly acid in reaction. The B_2 horizon is reddish brown, clay loam in texture, and friable. Soil reaction is neutral in this horizon. The parent material is pale brown in colour, fine sandy loam texture, and calcareous.

Utilization

Percy fine sandy loam is suitable for fruit and vegetable production. It is a good soil for general farm crops and will produce better than average yields of fall wheat, spring grains and hay. Good drainage, ease of cultivation and freedom from stone are the desirable characteristics of this soil. It has a lower fertility level than the finer textured soils and requires larger applications of fertilizer.

Sweet corn growing on Percy fine sandy loam.

TRENT SERIES

The Trent series are soils developed on calcareous fine sandy loam of sedimentary origin. The largest acreage of the series occurs in the area surrounding Foxboro.

The topography is very gently sloping. These soils are imperfectly drained. They are classified as gleyed Grey-Brown Podzolic soils.

The cultivated layer is about 6 inches thick. It is a very dark brown fine sandy loam layer. The soil reaction of this layer is neutral. The leached horizon is yellowish brown in colour and mottled in the lower part of the horizon. The B horizon is generally not more than 2 inches thick. It is a deeper yellow-brown than the horizon above and is moderately mottled. The parent material is a light yellowish brown fine sandy loam.

Utilization

Since most of this soil occurs close to a canning plant at Foxboro, it is used extensively for growing canning crops. Corn and tomatoes are grown to a considerable extent as cash crops. The series is suitable for the production of small fruits and vegetables. The Trent soils are fair for general farm crops.

FOXBORO SERIES

The Foxboro soils cover an area of 3,700 acres and are developed from soil parent materials consisting of fine sand and silt. Most of this acreage of Foxboro soil occurs in the area surrounding the village of Foxboro from which the soil derives its name.

The topography is nearly level to slightly depressional. Drainage is poor and the soil is classified as Dark Grey Gleysolic.

The cultivated surface is about 7 inches thick. It is a very dark grey fine sandy loam layer. Soil reaction is neutral to alkaline. The subsoil is a mottled, grey-brown fine sandy loam. Free carbonates are usually present in this horizon. The parent material is a light brownish grey fine sandy loam. It is mottled and calcareous.

Utilization

Poor drainage restricts the use of this series for the production of cereal grain. It will produce fair to poor crops of hay and oats depending on the weather. It is used in the production of corn for canning but it is not a reliable soil for either canning or farm crops unless it is tile drained.

FARMINGTON SERIES

The largest acreage of Farmington soils in the County occur in Thurlow and Tyendinaga townships. These soils have less than one foot of glacial till over limestone bedrock. They occur as broad level table lands, broken by the occasional escarpment.

Some rocky areas have been included with the Farmington series with little or no till over the rock, but generally there are several inches of soil cover. The profile developed in the shallow till of these soils is classified as Brown Forest.

Landscape of Farmington loam.

The surface of the uncultivated soil is about 3 inches thick, dark grey in colour, and usually loam in texture. It is about neutral in reaction. The B horizon is about 2 inches thick, brown in colour, and has a friable subangular blocky structure. The texture of this horizon is loam to clay loam, and is alkaline in reaction. The B horizon rests on the limestone bedrock.

Utilization

The Farmington soils are used principally as pasture land, since they are not suitable for cultivation.

AMELIASBURG SERIES

The Ameliasburg soils have developed on clay to clay loam till, a deposit that is 1 to 2 feet in depth and overlies a thinly bedded limestone. The topography is gently to moderately sloping. Water penetrates readily through the thinly bedded limestone so that these soils are moderately well drained. Horizon development is not very strong but they do have characteristics of Brown Forest Soils.

The cultivated surface is very dark grey-brown clay loam, and contains a number of limestone fragments. The soil reaction is alkaline. The subsoil is about 9 inches thick and is a reddish brown clay with numerous limestone fragments. This horizon is underlain by loose, broken limestone rock.

Utilization

The Ameliasburg soils are used for general farming. They produce good to fair crops of hay, oats and fall wheat, but are susceptible to drought.

Ameliasburg Clay Loam — Bouldery Phase

This soil has a higher proportion of boulders and limestone fragments than the Ameliasburg clay loam. The boulders and fragments make cultivation very difficult and reduces the value of the soil for agricultural purposes. Its land use is similar to that of the series described above.

BOTTOM LAND

Bottom land is low lying land that occurs along stream courses and is subjected to periodic flooding. It is an alluvial soil with a dark surface horizon but having no other horizon development.

Bottom land may range in texture from sandy loam to clay loam.

Utilization

Bottom land is utilized mostly for pasture and is excellent for this purpose. These alluvial soil materials are often quite fertile and produce an abundance of pasture throughout the summer.

MUCK

The muck soil consists of 15 inches or more of organic material over the mineral layers. In muck soils the organic materials are partially decomposed and black in colour. They are generally alkaline in reaction.

Utilization

Muck soils are not being used for agriculture to any extent in Hastings County. They are uncleared and support a tree vegetation including balsam, soft maple, white ash, cedar, black spruce and tamarac.

PEAT

The peat deposits consist of brownish relatively undecomposed woody residues or residues of spaghnum moss. These areas are not developed for agriculture and support some forest vegetation.

They provide forest products and are wildlife sanctuaries.

PEAT OVER MARL

A few areas of marl were found in the County having about 1 foot of peat over the marl deposit.

These areas are under tree cover and neither the peat or the marl are utilized at the present time.

MISCELLANEOUS MAPPING UNITS

Marsh

Flooded areas of mineral soils were mapped as marsh. They support a water loving vegetation such as cattails, marsh grass, and other reeds. These soils are under water except during long dry spells.

Tweed - Burnstown - Monteagle Complex

This complex is a land area of deep and shallow soils broken by numerous outcroppings of rock which are chiefly crystalline limestone. Soil profile develop-

ment is affected by the composition of the soil material and its depth over the limestone rock. The Tweed series has a Brown Forest development and the underlying limestone is not more than a foot below the surface. The Burnstown sandy loam has a Brunisolic-Grey-Brown podzolic profile and the depth of soil ranges between 12 and 15 inches. This is a shallow phase of the Burnstown soils. The Monteagle sandy loam is a Podzol occurring on the more acidic soil materials. The depth of soil over the rock is extremely variable even over very short distances and all three profiles are found in close association with each other.

This complex is potentially fair range land. The higher pH level of the soil permits the growth of better species of pasture plants. At present, most of the area is woodland. Profile descriptions are in the appendix of this report.

Rockland (Monteagle Materials)

The areas mapped as Rockland are from 50 to 90 per cent rock or thinly covered rock with small deposits of deeper soil materials in the crevices. Monteagle materials are the dominant components associated with the outcrop. Other components are Muck and Kenabeek sandy loam.

Utilization

Rockland is too rocky for the use of agricultural machinery and its only agricultural use is for range land. It is presently being used in a limited way for rough pasture and is producing some forest products.

Rock Outcrop

When bare rock or extremely thinly covered rock occupied 90 per cent or more of the land area, the region was mapped as rock outcrop. Muck or Peat, occur in depressions. Monteagle soils form part of the complex.

Utilization

Areas mapped as Rock Outcrop are not considered to be suitable for any agricultural purpose.

CROP ADAPTABILITY RATINGS FOR THE SOILS OF HASTINGS COUNTY

The crops which are produced in Hastings County are, for the most part, crops which are required to maintain the dairy industry. The potentialities and limitations of the soils have been discussed previously in this report. The relative adaptability of individual soil types for selected crops commonly grown in the County are summarized below.

The ratings and yield estimates presented here are based on the general productivity and fertility of each soil. Estimated yields of standing crops made by the survey party as well as yield data supplied by farmers were used in establishing the soil ratings. Introduction of new varieties of crops, new management practices, market variations and other factors may necessitate adjustments or changes in some of the ratings.

Making use of these relative adaptability ratings, the soils of the County have been placed into six groups and ratings are given for eight crops. The variability of rainfall within the County is wide and will affect crop yields on the same soil type in different areas so as to give differences in yields.

TABLE 8

CROP ADAPTABILITY RATINGS FOR THE SOILS OF HASTINGS COUNTY

Soil Type	Fall Wheat	Oats	Mixed Hay	Alfalfa	Red Clover	Timothy	Ensilage Corn	Pasture
GOOD CROPLAND								
Bondhead loam	G	G	G	G	G	G	G	G
Eldorado loam	G	G	G	G	G	G	G	G
South Bay clay	G-F	G	G-F	G-F	G	G	G	G
Waupoos clay loam	G	G	G	G	G	G	G	G
Waupoos clay	G	G	G	G-F	G	G	G-F	G
Otonabee loam	G	G	G	G	G	G	F	G
Bondhead sandy loam	G-F	G-F	G	G	G	G	G	G-F
Otonabee sandy loam	G-F	G-F	G	G	G	G	G-F	G-F
Eldorado sandy loam	G-F	G-F	G	G	G	G	G	G-F
GOOD TO FAIR CROPLAND								
Percy fine sandy loam	G-F	G-F	G-F	G-F	G-F	G-F	G	G-F
Bookton sandy loam	G-F	G-F	G-F	F	G	G	G	G-F
Solmesville clay loam	F	G-F	G	F-P	G	G	G	G
Dundonald sandy loam	G-F	G-F	G-F	G-F	F	G	G	G-F
Elmbrook silt loam	F	G-F	G	F-P	G	G	G-F	G
Elmbrook clay	F	G-F	G	F-P	G	G	G-F	G
Emily loam	F	F	G-F	F-P	G	G	G-F	G
FAIR CROPLAND								
Dundonald sandy loam — stony phase	F-P	F	F	F	F	F	F	F
Bondhead loam — stony	F	F	F	F	F	F	F	G
Bondhead sandy loam — stony phase	F	F	F	F	F	F	F	F
Tioga sandy loam	F-P	F	F	F-P	F	F	F	F
Tioga sandy loam — stony phase	F-P	F	F	F-P	F	F	F	F
Trent fine sandy loam	F	F	F	F-P	F	F	G-F	F
Berrien sandy loam	F	F	F	F-P	F	F	F	F
Ameliasburg clay loam	F	F	F	F	F	F	F-P	F
FAIR TO POOR CROPLAND								
Sidney clay	F-P	F	F	P	G-F	G-F	F-P	F
Lindsay clay loam	F-P	F	F	P	G-F	G-F	F-P	F
Lindsay clay	F-P	F	F	P	G-F	G-F	F-P	F
Alliston sandy loam	F-P	F-P	F	P	F	F	F	F
Otonabee loam — stony phase	F-P	F-P	F-P	F-P	F-P	F-P	F-P	G-F
Emily loam — stony phase	P	F-P	F-P	F-P	F-P	F-P	F-P	G-F
Ameliasburg clay loam — bouldery phase	F-P	F-P	F-P	F-P	F-P	F-P	F-P	G-F
Lindsay clay loam — stony phase	P	F-P	F-P	P	F-P	F-P	F-P	F
Sidney clay — stony phase	P	F-P	F-P	P	F-P	F-P	F-P	F
Elmbrook clay — stony phase	P	F-P	F-P	P	F-P	F-P	P	G-F
Otonabee loam — shallow phase	P	F-P	F-P	P	P	F-P	P	F
Lindsay clay loam — shallow phase	P	F-P	F-P	P	P	F	P	G-F
POOR CROPLAND								
Monteagle sandy loam	P	F	F	P	P	F	F-P	F
Lyons loam	P	P	F	P	F-P	F	P	G-F
Foxboro fine sandy loam	P	F-P	F-P	P	F-P	F-P	P	F-P
Wauseon sandy loam	P	P	F-P	P	P	F-P	P	F-P
Bondhead loam — steep phase	P	P	F-P	F-P	P	F	P	F
Eldorado loam — steep phase	P	P	F-P	F-P	P	F	P	F
Otonabee loam — steep phase	P	P	F-P	F-P	P	F	P	F
Bancroft sandy loam	P	F-P	F-P	P	P	F-P	P	P
Granby sandy loam	P	P	F-P	P	F-P	F-P	P	F-P
South Bay silt loam — hilly phase	P	P	F-P	P	P	F-P	P	F
St. Peter's gravelly sandy loam	P	P	P	P	P	F-P	P	F-P
Alliston sandy loam—shallow phase	P	P	P	P	P	F-P	P	F-P
Cramahe gravelly sandy loam	P	P	P	P	P	P	P	F-P

Abbreviations: G - good G-F - good to fair F - fair F-P - fair to poor P - poor

Group 1. **GOOD CROPLAND**

	Acreage	% Total Acreage of County
Bondhead loam	5,600	.4
Eldorado loam	8,100	.5
South Bay clay	5,700	.4
Waupoos clay loam	400	....
Waupoos clay	5,000	.3
Otonabee loam	30,200	2.0
Bondhead sandy loam	29,600	2.0
Otonabee sandy loam	400	....
Eldorado sandy loam	1,500	.1
	86,500	5.7

The above soil series are considered to be the best soils in the County for general farming. They are all well to moderately well drained and will grow a fairly wide range of crops.

Group 2. **GOOD TO FAIR CROPLAND**

	Acreage	% Total Acreage of County
Percy fine sandy loam	2,900	.2
Bookton sandy loam	2,500	.2
Solmesville clay loam	12,500	.8
Dundonald sandy loam	1,700	.1
Elmbrook silt loam	300	....
Elmbrook clay	11,900	.8
Emily loam	1,700	.1
	33,500	2.2

The soils listed above have certain characteristics such as sandy textures, imperfect drainage and lower inherent fertility, that makes them less productive than the good cropland soils of Class 1.

Group 3. **FAIR CROPLAND**

	Acreage	% Total Acreage of County
Dundonald sandy loam — stony phase	700	....
Bondhead loam — stony phase	3,700	.25
Bondhead sandy loam — stony phase	2,500	.17
Tioga sandy loam	17,500	1.18
Tioga sandy loam — stony phase	200	....
Berrien sandy loam	1,200	.08
Ameliasburg clay loam	1,200	.08
Trent fine sandy loam	2,100	.14
	29,100	1.90

The four stony phases are placed in this group because considerable labour is required to keep these soils reasonably clear of stones and boulders. Fence rows often consist of stone fences and enlargement of fields is a costly enterprise.

The Tioga series is low in fertility and crops on this series are more critically affected by drought. The stony phase of this series requires stone removal. The Tioga soils are suitable for the production of fruit and vegetables.

The Ameliasburg series has a shallow till over thinly bedded limestone. It is inclined to be a droughty soil for shallow rooted plants. It is a fair soil for general farm crops but is more suitable for tree fruits and tomatoes.

The Berrien and Trent series are imperfectly drained sandy loam soils. They are more suitable for vegetable growing than for general farm crops.

Group 4. FAIR TO POOR CROPLAND

	Acreage	% Total Acreage of County
Alliston sandy loam	1,200	.08
Sidney clay	42,900	2.90
Lindsay clay loam	200	....
Lindsay clay	1,500	.10
Otonabee loam — stony phase	6,100	.41
Emily loam — stony phase	100	....
Ameliasburg clay loam — bouldery phase	200	....
Lindsay clay loam — stony phase	500	.03
Sidney clay — stony phase	100	....
Elmbrook clay — stony phase	200	....
Otonabee loam — shallow phase	200	....
Lindsay clay loam — shallow phase	600	.04
	53,800	3.55

The Sidney and Lindsay series are poorly drained clays. This restricts the range of crops which may be grown and the risk of crop failure is high. The phases listed here are stony or shallow to bedrock phases and these characteristics reduce the value of the soil for agriculture. The Alliston series is an imperfectly drained sandy outwash. This series is low in fertility in addition to the drainage problem.

Group 5. POOR CROPLAND

	Acreage	% Total Acreage of County
Monteagle sandy loam	59,600	4.00
Lyons loam	2,600	.17
Foxboro fine sandy loam	3,700	.25
Wauseon sandy loam	300	.02
Bondhead loam — steep phase	300	.02
Bondhead sandy loam — steep phase	17,300	1.17
Eldorado loam — steep phase	300	.02
Otonabee loam — steep phase	900	.06
Bancroft sandy loam	35,100	2.28
Granby sandy loam	6,500	.44
South Bay silt loam — hilly phase	400	.03
St. Peter's gravelly sandy loam	9,900	.67
Alliston sandy loam — shallow phase	700	.05
Cramahe gravelly sandy loam	6,100	.41
	143,700	9.69

These soils are suitable for hay and pasture. The steep phases are very good pasture soils but are too steep for other than occasional cultivation. Bancroft sandy loam is used to some extent for cropping but poor yields are obtained for most crops.

Group 6. NON-AGRICULTURAL LAND

	Acreage	% Total Acreage of County
Dummer loam	71,900	4.80
Deloro loam	8,900	.60
Dummer sandy loam	900	.06
Bottom land	11,100	.75
Lyons loam — stony phase	100	
Deloro loam — steep phase	1,300	.08
Tweed sandy loam	6,700	.45
Deloro loam — shallow phase	1,900	.13
South Bay clay — rocky phase	1,000	.07
Dummer loam — shallow phase	60,500	4.10
Farmington loam	40,500	2.62
Wendigo sandy loam	13,600	.92
Wendigo sandy loam — shallow phase	10,200	.69
Rockland	711,700	48.00
Muck	88,400	5.90
Peat	1,200	.81
Peat over Marl	400	.03
Marsh	5,600	.38
Rock Outcrop	89,100	6.00
	1,123,000	76.39

These soils are not suitable for the production of agricultural crops. Some of them can be used as range land as shown in Table (7).

TABLE 9

AVERAGE YIELDS FOR SELECTED CROPS ON HASTINGS COUNTY SOILS * 1953 - 1954

Soil Type	Fall Wheat bu./ac.	Oats bu./ac.	Alfalfa tons/ac.	Mixed Hay tons/ac.	Corn tons/ac.
GOOD CROPLAND					
Bondhead loam	40	50	2¼	2¾	14
Eldorado loam	40	50	2¼	2¾	14
South Bay clay	40	50	2	2¾	14
Waupoos clay loam	40	50	2	2¾	14
Waupoos clay	40	50	2	2¾	14
Otonabee loam	35	45	2½	2¾	12
Bondhead sandy loam	35	45	2¼	2¾	14
Otonabee sandy loam	35	45	2¼	2½	12
Eldorado sandy loam	35	45	2	2½	12
GOOD TO FAIR CROPLAND					
Percy fine sandy loam	35	40	1½	2	12
Bookton sandy loam	25	35	1½	2	12
Solmesville clay loam	35	40	2	2¾	14
Dundonald sandy loam	35	40	2	2	12
Elmbrook silt loam	30	40	1¼	2½	14
Elmbrook clay	30	40	1¼	2½	14
Emily loam	30	40	1¼	2½	12
FAIR CROPLAND					
Dundonald sandy loam — stony phase	30	40	2	2	12
Bondhead loam — stony phase	30	40	2	2	12
Bondhead sandy loam — stony phase	30	40	2	2	12
Tioga sandy loam	20	25	1	1½	7
Tioga sandy loam — stony phase	20	25	1	1½	7
Berrien sandy loam	20	25	1¼	2	8
Ameliasburg clay loam	30	30	1¼	2¼	10
Trent fine sandy loam	20	25	1	1½	10
FAIR TO POOR CROPLAND					
Alliston sandy loam	20	20	—	1	6
Sidney clay	20	30	—	2¼	7
Lindsay clay loam	20	30	—	2¼	7
Lindsay clay	20	30	—	2¼	7
Otonabee loam — stony phase	20	30	2½	2½	10
Emily loam — stony phase	20	25	—	2	7
Ameliasburg clay loam — bouldery phase	20	30	1½	2	10
Lindsay clay loam — stony phase	20	20	—	1½	6
Sidney clay — stony phase	—	20	—	1½	6
Elmbrook clay — stony phase	—	35	—	1¼	7
Emily loam — shallow phase	—	20	—	1¼	—
Otonabee loam — shallow phase	—	20	—	1¼	—
Lindsay clay loam — shallow phase	—	25	—	1½	—
POOR CROPLAND					
Monteagle sandy loam	—	20	—	1	—
Lyons loam	—	—	—	1½	—
Foxboro fine sandy loam	—	20	—	1¼	—
Wauseon sandy loam	—	—	—	1½	—
Bondhead loam — steep phase	—	—	—	—	—
Bondhead sandy loam — steep phase	—	—	—	—	—
Eldorado loam — steep phase	—	—	—	—	—
Otonabee loam — steep phase	—	—	—	—	—
Bancroft sandy loam	—	20	—	¾	—
Granby sandy loam	—	—	—	½	—
South Bay silt loam — hilly phase	—	—	—	—	—
St. Peter's gravelly sandy loam	—	20	—	½	—
Alliston sandy loam — shallow phase	—	—	—	½	—
Cramahe gravelly sandy loam	—	—	—	—	—

* Yield data reported by farmers and/or estimated from standing crops by survey party.

TAXONOMIC CLASSIFICATION, PROFILE DESCRIPTIONS AND ANALYTICAL DATA

ALLISTON SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Gleyed Bisequa — Grey-Brown Podzolic*
Family — Alliston

Description:

Ac	(Aa)	— 0-6 inches very dark grey (10 YR 3/1) sandy loam, crumb structure, very friable consistency; pH 7.2.
B_2	(Bh)	— 6-14 inches light yellowish brown (10 YR 6/4) sand; single grain structure; slightly mottled; pH 6.7.
A_2	(Ae)	— 14-22 inches grey (10 YR 6/1) sand; mottled; single grain structure; pH 6.8.
B_2	(Btg)	— 22-26 inches light yellowish brown (10 YR 6/4) loamy sand; very mottled; single grain structure; pH 6.8.
C	(C)	— pale brown (10 YR 6/3) sand; calcareous; pH 8.0.

* NOTE: In some areas this series has been called a Bisequa-Podzol because the BT horizon was generally found at depths greater than 30".

AMELIASBURG SERIES

Classification: Order — Brunisolic
Great Soil Group — Brown Forest
Soil Group — Orthic Brown Forest
Family — Ameliasburg

Description:

Ac	(Aa)	— 0-6 inches very dark grey-brown (10 YR 3/3) clay loam; subangular blocky structure; friable consistence; numerous small fragments of limestone; free carbonates; pH 7.8.
B	(Bm)	— 6-15 inches reddish brown (5 YR 4/3) clay loam; subangular blocky structure; friable; limestone fragments; free carbonates present; pH 7.8.
D	(R)	— loose broken limestone bedrock with shale partings.

BANCROFT SERIES

Classification: Order — Podzolic
Great Soil Group — Podzol
Soil Group — Orthic Podzol
Family — Wendigo

Description:

A_0	(F)	— leaf litter, twigs, etc..
A_2	(Ae)	— 0-2″ white (10 YR 8/2) sand; single grain structure; loose consistence; pH 4.6.
B_2	(Bhf_1)	— 2-10″ yellowish red (5 YR 5/6) sandy; loam; weakly granular structure; very friable; pH 4.8.
B_3	(Bhf_2)	— 10-18″ yellowish brown (10 YR 5/4) sand; weakly granular structure; pH 5.0.
C	(C)	— greyish brown sand; pH 5.6..

BERRIEN SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Gleyed Grey-Brown Podzolic
Family — Berrien

Description:

Ac	(Aa)	— 0-7″ very dark grey (10 YR 3/1) sandy loam; crumb structure; very friable consistence; pH 7.1.
A_2	(Ae)	— 7-24″ yellow-brown (10 YR 5/4) sandy loam; mottled in lower part of horizon; granular structure; friable; pH 7.2.
B_2	(Btg)	— 24-25″ dark brown (10 YR 4/3 loam; subangular blocky structure; friable consistence; mottled; pH 7.4.
D	(II C)	— grey clay; stonefree; calcareous; pH 8.2.

BOOKTON SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Brunisolic — Grey-Brown Podzolic
Family — Bookton

Description:

Ac	(Aa)	— 0-6″ very dark grey (10 YR 3/1) sandy loam; fine crumb structure; very friable consistence; pH 6.9.
A_{21}	(Ae_1)	— 6-20″ yellowish loam (10 YR 5/6) sandy loam; weak platy structure; very friable; pH 6.6.
A_{22}	(Ae_2)	— 20-22″ pale brown (10 YR 6/3) sandy loam; platy structure; friable; pH 6.6.
B_2D	(II Bt)	— 22-25″ brown (7.5 YR 5/4) clay; subangular blocky structure; firm consistence; pH 7.2.
D	(II C)	— grey clay; stonefree; calcareous; pH 8.2.

BONDHEAD SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Brunisolic — Grey-Brown Podzolic
Family — Guelph

Type: Bondhead sandy loam

Location: N.W. Foxboro — drumlin 1 mile north on side road bounding Ketcheson farm.

Physiography: drumlin — slope at site 12 per cent.

Vegetation: maple, beech association.

Description:

A_1 (Ah) — 0-3″ very dark grey-brown (-0 YR 3 2) sandy loam; crumb structure; friable.

A_{21} (Ae_1) — 3-8″ dark brown (10 YR 4 3) sandy loam; fine crumb structure; very few stones.

A_{22} (Ae_2) — 8-17″ dark grey-brown (10 YR 4 2; sandy loam; fine crumb structure; few stones.

B_2 (Bt) — 17-21″ dark grey-brown (7.5 YR 4 2) clay loam; subangular blocky; friable; some stones.

C_1 (B C) — 21-28″ grey-brown (10 YR 5 2) moderately stony till, with some thin strands of B horizon.

C_2 (C_2) — 28-36″ grey-brown (10 YR 5 2) moderately stony till.

Profile Analysis

Horizon	% Sand	% Clay	pH	O.C.	Exchange Cations Ca.	Mg.	K	C.E.C.	Base Saturation
A_1	54	16	6.00	4.30	9.4	1.5	.33	12.7	88
A_{21}	53	17	5.55	.62	2.9	0.8	.16	5.8	54
A_{22}	57	18	6.45	.20	4.9	0.4	.13	5.8	93
B_2	45	33	7.10	.52	16.9	0.6	.29	16.4	100
C_1	56	22	7.80	.12	12.8	0.4	.14	5.5	100
C_2	54	24	7.80	.08	12.8	0.6	.13	4.8	100

BURNSTOWN SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Brunisolic — Grey-Brown Podzolic
Family — Vasey

Description:

A_1 (Ah) — 0-3″ very dark grey-brown (10 YR 3/1) sandy loam; crumb structure; stony; pH 5.8.

B_2 (Bhf) — 3-8″ strong brown (7.5 YR 5/6) sandy loam; crumb structure; stony; pH 5.5.

A_2(GBP) (Ae) — 8-16″ brown (10 YR 5/3) sandy loam; crumb structure; friable; stony; pH 5.6.

B_2 (Btj) — 16-20″ dark yellowish brown (10 YR 3/4) sandy loam; subangular blocky structure; friable; stony; pH 6.8.

D (R) — crystalline limestone bedrock.

CRAMAHE SERIES

Classification: Order — Brunisolic
Great Soil Group — Brown Forest
Soil Group — Orthic Brown Forest
Family — Sargent

Description:

A_1	(Ah)	— 0-4″ very dark brown (10 YR 2/2) gravelly loamy sand; crumb and granular structure; very friable consistence; free carbonates present; pH 7.5.
B_1	(Bm_1)	— 4-8″ dark yellowish brown (10 YR 4/4) gravelly sandy loam; weak subangular blocky structure; very friable; stony; pH 7.6.
B_2	(Bm_2)	— 8-11″ reddish brown (5 YR 4/3) gravelly sandy loam; subangular blocky structure; friable; stony; pH 7.8.
C	(C)	— grey sand and gravel; calcareous; pH 8.2.

DELORO SERIES

Classification: Order — Brunisolic
Great Brown Group — Brown Forest
Soil Group — degraded Brown Forest
Family — Osprey

Description:

A_1	(Ah)	— 0-3″ dark brown (10 YR 3/2) loam; crumb structure; friable consistency; pH 6.8.
B_1	(Bm)	— 3-8″ dark brown (10 YR 4/3) loam; granular structure; friable consistence; pH 6.8.
B_2	(Btj)	— 8-11″ dark reddish brown (7.5 YR 4/4(clay loam; subangular blocky structure; friable; stony; free carbonates; pH 7.4.
C	(C)	— reddish (5 YR 4/3) loam; very stony; pH 8.2.

DUNDONALD SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Brunisolic — Grey-Brown Podzolic
Family — Bookton

Description:

Ac	(Aa)	— 0-6″ very dark grey (7.5 YR 3/0) sandy loam; granular structure; very friable; pH 6.5.
A_{21}	(Ae_1)	— 6-12″ yellowish brown (10 YR 4/4) sand; weakly platy and single grain structure; pH 6.4.
A_{22}	(Ae_2)	— 12-22″ pale brown (10 YR 6/3) sand; weakly platy; pH 6.8.
B_2	(Bt)	— 22-24″ dark reddish brown (5 YR 3/2 loam; nuciform structure; friable; free carbonates; pH 7.4.
D	(II C)	— grey-brown calcareous till.

DUMMER SERIES

Classification: Order — Brunisolic
Great Soil Group — Brown Forest
Soil Group — Degraded Brown Forest
Family — Osprey

Description:

A_1	(Ah)	— 0-3″ black (10 YR 2/0) loam; crumb structure; friable consistence; stony; free carbonates present; pH 7.4.
B_1	(Bm)	— 3-5″ very dark grey-brown (10 YR 3/2) loam; granular structure; friable; stony; free carbonates present; pH 7.4.
B_2	(Btj)	— 5-9″ brown (7.5 YR 3/2) clay loam; subangular blocky structure; friable; stony; free carbonates present; pH 7.8.
C	(C)	— grey-brown (10 YR 5/2) loam; very stony; calcareous; pH 8.3.

FARMINGTON SERIES

Classification: Order — Brunisolic
Great Soil Group — Brown Forest
Soil Group — Orthic Brown Forest
Family — Farmington

Description:

A_1	(Ah)	— 0-3″ dark grey (10 YR 4/4) loam; crumb structure; friable; pH 6.8.
B_1	(Bm_1)	— 3-8″ yellow-brown (10 YR 5/3) loam; subangular blocky structure; friable; pH 6.8.
B_2	(Bm_2)	— 8-10″ brown (7.5 YR 5/4 loam; subangular blocky structure; friable; pH 7.0.
D	(R)	— limestone bedrock.

ELMBROOK SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Gleyed Grey-Brown Podzolic
Family — Haldimand

Description:

Ac	(Aa)	— 0-5″ very dark brown (10 YR 2/2) clay; small angular blocky structure; friable consistence; pH 7.0.
A_2	(Ae)	— 5-9″ dark grey-brown (10 YR 4/2) clay; medium angular blocky structure; firm consistence; slight mottling; pH 6.8.
B_2	(Bt)	— 9-15″ dark brown (7.5 YR 3/2) clay; large angular blocky structure; hard; pH 7.2.
C_1	(Bmg)	— 15-24″ dark grey-brown (10 YR 4/2) clay; mottled; large angular blocky structure; firm consistence; pH 7.2.
C_2	(C_2)	— dark grey (10 YR 4/1) clay; stonefree; calcareous; pH 8.2.

ELDORADO SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group -- Brunisolic — Grey-Brown Podzolic
Family — Guelph

Description:

Ac	(Aa)	— 0-6″ dark brown (10 YR 4/3 loam; granular and crumb structure; friable consistence; pH 6.8.
A_2	(Ae)	— 6-14″ dark reddish grey (5 YR 4/2) loam; granular with some weak platy structure; friable; few stones; pH 6.8.
B_2	(Bt)	— 14-22″ dark reddish brown (5 YR 3/3) clay loam; subangular blocky structure; firm; pH 7.2.
C	(C)	— reddish brown (5 YR 4/3) clay loam; stony; calcareous pH 8.0.

EMILY SERIES

Classification: Order — Brunisolic
Great Soil Group — Brown Forest
Soil Group — Gleyed Brown Forest
Family — Matilda

Description:

Ac	(Aa)	— 0-6″ very dark brown (10 YR 2/2) loam; granular structure; friable consistence; pH 7.2.
B_1	(Bm_1)	— 6-9″ very dark grey-brown (10 YR 3/2) loam; granular structure; friable; pH 7.2.
B_2	(Bm_2g)	— 9-12″ very dark grey-brown (10 YR 2/2) loam; weak subangular blocky structure; mottled; free carbonates present; pH 7.4.
C_1	(C_1)	— 12-15″ grey-brown (10 YR 5/2) loam; very weak subangular blocky structure; mottled; calcareous; pH 7.8.
C_2	(C_2)	— grey (10 YR 5/4) loam; stony; pH 8.2.

FOXBORO SERIES

Classification: Order — Gleysolic
Great Soil Group — Dark Grey Gleysolic
Soil Group — Orthic Dark Grey Gleysolic
Family — Colwood

Description:

Ac	(Aa)	— 0-7″ very dark grey (10 YR 3/1) fine sandy loam; crumb structure; very friable consistence; free carbonates usually present; stonefree; pH 7.4.
G	(Bmg)	— 7-22″ grey-brown (2.5 YR 5/2) fine sandy loam; mottled; subangular blocky structure; friable; free carbonates present; pH 7.4.
C	(C)	— light brown-grey (10 YR 6/2) fine sand with occasional lenses of silt; mottled; calcareous; pH 8.0.

GRANBY SERIES

Classification: Order — Gleysolic
Great Soil Group — Dark Grey Gleysolic
Soil Group — Orthic Dark Grey Gleysolic
Family — Granby

Description:

Ac	(Aa)	— 0-9″ very dark brown (10 YR 2/2) sandy loam; crumb structure; very friable consistence; pH 7.3.
G_1	(Bmg_1)	— 9-17″ grey (10 YR 6/1) sand; mottled; single grain structure; loose consistence; pH 7.4.
G_2	(Bmg_2)	— 17-27″ light brownish grey (10 YR 6/2) sand; mottled; single grain structure; free carbonates; pH 7.6.
C	(C)	— grey sand; calcareous; pH 8.2.

LINDSAY SERIES

Classification: Order — Gleysolic
Great Soil Group — Dark Grey Gleysolic
Soil Group — Orthic Dark Grey Gleysolic
Family — Brookston

Description:

Ac	(Aa)	— 0-6″ very dark grey (10 YR 3 1) clay loam; subangular blocky structure; friable consistence; stone-free; pH 7.4.
G	(Bmg)	— 6-12″ pale brown (10 YR 6 3) clay loam; mottled; subangular blocky structure; friable; few stones; pH 7.6.
D	(II C)	— grey clay loam; mottled; stony; calcareous; pH 8.2.

LYONS SERIES

Classification: Order — Gleysolic
Great Soil Group — Dark Grey Gleysolic
Soil Group — Orthic Dark Grey Gleysolic
Family — Lyons

Description:

Ac	(Aa)	— 0-8″ black (10 YR 2 1) loam; crumb structure; very friable consistence; few stones; pH 7.2.
G_1	(Bmg_1)	— 8-13″ grey (10 YR 5/1) loam; mottled; subangular blocky structure; friable; pH 7.2.
G_2	(Bmg_2)	— 13-18″ grey (10 YR 5/1) loam; mottled; coarse subangular blocky structure; free carbonates present; pH 7.4.
C	(C)	— grey (10 YR 5/1) loam; stony; pH 8.2.

MONTEAGLE SERIES

Classification: Order — Podzolic
Great Soil Group — Podzol
Soil Group — Orthic Podzol
Family — Wabi

Type: Monteagle sandy loam.

Location: North of Bancroft at Hickey Settlement.

Physiography: till moraine — slope at site 8%.

Vegetation: maple, pine, white birch, aspen.

Profile Description:

A_0 (F) — 1-0″ organic layer containing leaves, twigs, moss.

A_2 (Ae) — 0-3″ light grey (10 YR. 6/1) sand; single grain structure; loose consistence; stones.

B_2 (Bhf_1) — 3-12″ dark reddish brown (5 YR 3/4) sandy loam; granular to crumb structure; friable; some iron concretions.

B_3 (Bhf_2) — 12-22″ yellow-brown (10 YR 5/6) sandy loam; weak granular structure; friable; stony.

C (C) — light olive-brown (2.5 YR 5/4) sandy loam; very stony.

Profile Analysis

Horizon	% Sand	% Clay	pH	O.C.	Exchange Cations Ca.	Mg.	K	H+	C.E.C.	% Base Saturation
A_0	—	—	4.50	—	—	—	—	—	—	—
A_2	63	11	4.75	1.17	1.00	0.08	0.06	4	4.9	23
B_2	65	14	4.75	2.40	0.60	0.48	0.04	11	12.0	9
B_3	81	11	5.30	0.69	0.30	0.24	0.02	4	5.0	11
C	70	11	5.40	0.09	0.25	0.16	0.07	2	2.0	20

OTONABEE SERIES

Classification: Order — Brunisolic
Great Soil Group — Brown Forest
Soil Group — Degraded Brown Forest
Family — Otonabee

Description:

A_1 (Ah) — 0-4″ very dark grey (10 YR 3/1) loam; granular and crumb structure; soft; pH 7.2.

B_1 (Bm) — 4-8″ brown (7.5 YR 4/4) loam; small weak subangular blocky structure; very friable consistency; pH 6.8.

B_2 (Btj) — 8-12″ very dark brown (10 YR 2/2) clay loam; fine subangular blocky structure; firm consistence; few stones; calcareous; pH 7.4.

B_3 (B/C) — 12-16″ dark grey-brown (10 YR 4/2) loam; weak subangular blocky structure; friable; calcareous; pH 7.6.

C (C) — grey-brown (10 YR 5/2) loam; stony; calcareous; pH 8.3.

PERCY SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Brunisolic — Grey-Brown Podzolic
Family — Honeywood

Description:

Ac	(Aa)	— 0-5″ very dark grey (10 YR 3/1) fine sandy loam; crumb structure; friable consistence; pH 6.8.
A_{21}	(Ae_1)	— 5-10″ yellowish brown (10 YR 5/6) fine sandy loam; granular structure; very friable consistence; pH 6.5.
A_{22}	(Ae_2)	— 10-18″ light yellowish brown (10 YR 6/4) fine sandy loam; platy structure; friable; pH 6.4.
B_2	(Bt)	— 18-21″ reddish brown (5 YR 4/4) clay loam; fine to medium subangular blocky structure; friable consistence; pH 7.0.
C	(C)	— pale brown (10 YR 6/3) fine sandy loam; calcareous; pH 8.0.

SIDNEY SERIES

Classification: Order — Gleysolic
Great Soil Group — Dark Grey Gleysolic
Soil Group — Orthic Dark Grey Gleysolic
Family — Lincoln

Description:

Ac	(Aa)	— 0-6″ very dark grey (10 YR 3/1) clay; medium to large angular blocky structure; firm consistence; stonefree; pH 6.8.
G_1	(Bmg_1)	— 6-12″ dark brown (10 YR 4/3) clay; mottled; massive structure; plastic; stonefree; pH 7.0.
G_2	(Bmg_2)	— 12-18″ greyish brown (10 YR 5/2) clay; mottled; plastic; massive structure; pH 7.4.
C	(C)	— light brown-grey (10 YR 6/2) clay; calcareous; pH 8.0.

SOLMESVILLE SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Gleyed Grey-Brown Podzolic
Family — Perth

Description:

Ac	(Aa)	— 0-7″ very dark brown (10 YR 2/2) clay loam; small subangular blocky structure; friable consistence; stonefree; pH 7.3.
A_2	(Ae)	— 7-10″ dark greyish brown (10 YR 4/2) clay loam; subangular blocky structure; firm; pH 7.3.
B_2	(Bt)	— 10-14″ very dark greyish brown (10 YR 3/2) clay; mottled; subangular blocky structure; firm; calcareous in lower part of horizon; pH 7.4.
D	(II C)	— greyish brown loam till; stony; mottled; pH 8.2.

SOUTH BAY SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Orthic — Grey-Brown Podzolic
Family — South Bay

Description:

Ac	(Aa)	— 0-6″ dark grey-brown (10 YR 4/2) clay; subangular blocky structure; friable consistence; stonefree; pH 6.6.
A_2	(Ae)	— 6-17″ grey-brown (10 YR 5/2) clay; medium to coarse platy structure; friable consistence; stonefree; pH 6.4.
B_1	(A/B)	— 17-20″ dark grey-brown (10 YR 4/2) clay; medium angular blocky structure; firm consistence; stonefree; pH 6.8.
B_2	(Bt)	— 20-25″ very dark grey-brown (10 YR 3/2) clay; angular blocky structure; firm consistence; pH 7.0.
C_1	(B/C)	— 25-28″ grey-brown (10 YR 5/2) clay; angular blocky structure; firm consistence; pH 7.3.
C_2	(C_2)	— dark grey (10 YR 4/1) clay; angular blocky; free carbonates; pH 8.0.

ST. PETER'S SERIES

Classification: Order — Podzolic
Great Soil Group — Podzol
Soil Group — Orthic Podzol
Family — Wendigo

Description:

A_0	(L)	— 1-0″ organic layer of partially decomposed leaves, twigs, etc.
A_2	(Ae)	— 0-1″ light grey (10 YR 6/1) sand; single grain structure; loose consistence; pH 4.5.
B_2	(Bhf_1)	— 1-8″ reddish brown (5 YR 3/4) sand; granular structure; very friable; pH 4.8.
B_3	(Bhf_2)	— 8-18″ yellowish brown (10 YR 5/8) gravelly sand; single grain structure; loose consistence; pH 5.0.
D	(II C)	— grey-brown medium to coarse gravel; pH 5.4.

TIOGA SERIES

Classification: Order — Podzolic
Great Soil Group — Podzolic
Soil Group — Bisequa Grey-Brown Podzolic
Family — Tioga

Description:

A_0	(F)	— thin layer of partially decomposed leaves, twigs, etc.
A_1	(Ah)	— 0-3″ black (10 YR 2/1) sandy loam; fine crumb structure; very friable consistence; pH 5.0.
A_2(P)	(Ae)	— 3-4″ grey (10 YR 5/1) sand; single grain structure; loose consistence; pH 4.2.
B_2	(Bhf_1)	— 4-9″ strong brown (7.5 YR 5/6) sand; single grain structure; loose consistence; pH 5.8.
B_3	(Bhf_2)	— 9-13″ brownish yellow (10 YR 6/6) sand; single grain; loose consistence; pH 6.0.
A_2(GBP)	(Ae)	— 13-28″ light yellowish brown (10 YR 6/4) sand; single grain structure; loose consistence; pH 6.5.
B_2	(Bt)	— 28-32″ brown (10 YR 5/3) sandy loam; weak subangular block structure; friable consistence; pH 7.2.
C	(C)	— grey (10 YR 5/1) sand; single grain structure; loose consistence; calcareous; pH 7.8.

TRENT SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Gleyed Grey-Brown Podzolic
Family — Tuscola

Description:

Ac	(Ah)	— 0-6″ very dark brown (10 YR 2/2) fine sandy loam; crumb structure; very friable consistence; pH 6.6.
A_2	(Aeg)	— 6-14″ yellow-brown (10 YR 5/6) fine sandy loam; mottled in lower part of horizon; granular structure; very friable; pH 6.8.
B_2	(Bt)	— 14-16″ yellow-brown (10 YR 5/8) fine sandy loam; subangular blocky structure; friable; pH 7.2.
C	(C)	— light yellow-brown (10 YR 6/4) fine sandy loam; calcareous; pH 8.0.

TWEED SERIES

Classification: Order — Brunisolic
Great Soil Group — Brown Forest
Soil Group — Orthic Brown Forest
Family — Tweed

Description:

A_1	(Ah)	— 0-4″ very dark grey-brown (10 YR 3/2) sandy loam; crumb structure; friable consistence; pH 6.8.
B	(Bm)	— 4-12″ dark reddish brown (5 YR 3/4) sandy loam; granular structure; friable consistence; pH 7.2.
R	(R)	— crystalline limestone; the surface usually broken and weathered.

WAUPOOS SERIES

Classification: Order — Podzolic
Great Soil Group — Grey-Brown Podzolic
Soil Group — Orthic Grey-Brown Podzolic
Family — Huron

Description:

A_1	(Ah)	— 0-3″ very dark grey (10 YR 3/1) clay loam; small subangular blocky structure; friable consistence; stonefree; pH 6.8.
A_2	(Ae)	— 3-8″ brown (10 YR 4/3) clay loam; medium subangular blocky structure; firm consistence; stonefree; pH 6.7.
B_2	(Bt)	— 8-16″ dark brown (10 YR 3/3) clay; angular blocky structure; firm consistence; pH 7.4.
D	(II C)	— grey-brown (10 YR 5/2) loam; stony; calcareous; pH 8.3.

WAUSEON SERIES

Classification: Order — Gleysolic
Great Soil Group — Dark Grey Gleysolic
Soil Group — Orthic Dark Grey Gleysolic
Family — Granby

Description:

Ac	(Aa)	— 0-8″ very dark grey (10 YR 3/1) sandy loam; crumb structure; free carbonates present; pH 7.4.
G	(Bmg)	— 8-20″ grey (10 YR 5/2) sand; mottled; single grain structure; loose consistence; free carbonates; pH 7.6.
D	(II C)	— grey-brown (10 YR 5/2) clay; mottled.

WENDIGO SERIES

Classification: Order — Podzolic
Great Soil Group — Podzol
Soil Group — Orthic Podzol
Family — Wendigo

Type: Wendigo loamy sand.

Location: Bird's Creek, Hastings County.

Physiography: Outwash plain.

Vegetation: Spruce, pine.

Profile Description:

A_0	(L)	— 1-0″ loose covering of needles, twigs, etc.
A_2	(Ae)	— 0-4″ light grey (10 YR 7/1) sand; single grain structure; loose consistence.
B_2	(Bhf_1)	— 4-12″ dark reddish brown (5 YR 3/3) sandy loam; weak granular structure; some iron concretions.
B_3	(Bhf_2)	— 12-20″ yellowish brown (10 YR 5/8) sand; weak crumb to single grain structure.
C	(C)	— pale brown (10 YR 6/3) sand.

Profile Analysis

Horizon	% Sand	% Clay	pH	O.C.	Exchange Cations Ca.	Mg.	K	H+	C.E.C.	% Base Saturation
A_0	—	—	5.3	—	—	—	—	—	—	—
A_2	60	12	4.7	0.99	0.7	0.6	0.06	4	5.6	22
B_2	60	12	5.0	2.20	1.7	0.08	0.03	12	14.4	12
B_3	66	6	5.4	0.60	0.7	0.20	0.01	4	4.4	19
C	92	4	5.6	0.06	0.3	0.10	0.02	4	0.8	47

MAPS
NOT
FILMED

CARTES
OMISES